LANDMARK CONFERENCE

16TH ANNUAL LANDMARK CONFERENCE SUMMER RESEARCH SYMPOSIUM

JULY 10, 2025

ETOWN
ELIZABETHTOWN COLLEGE

16th Annual Landmark Conference Summer Research Symposium

July 10, 2025

The Landmark Summer Research Symposium brings together undergraduate researchers from the Landmark Conference schools, providing an opportunity for students to showcase the results of their faculty/student collaborative research in poster and oral presentation sessions.

LANDMARK CONFERENCE SCHOOLS

- THE CATHOLIC UNIVERSITY OF AMERICA
- THE UNIVERSITY OF SCRANTON
- ELIZABETHTOWN COLLEGE
- GOUCHER COLLEGE
- LYCOMING COLLEGE
- JUNIATA COLLEGE
- MORAVIAN UNIVERSITY
- SUSQUEHANNA UNIVERSITY
- DREW UNIVERSITY
- WILKES UNIVERSITY

LANDMARK SUMMER RESEARCH SYMPOSIUM HOSTING HISTORY

2010 | 2014 | 2018 | 2024
JUNIATA COLLEGE

2009 | 2013 | 2017 | 2023
SUSQUEHANNA UNIVERSITY

2011 | 2015 | 2021
GOUCHER COLLEGE

2019 | 2025
ELIZABETHTOWN COLLEGE

2012 | 2016 | 2022
MORAVIAN COLLEGE

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ELIZABETHTOWN COLLEGE CAMPUS MAP

ETOWN
ELIZABETHTOWN COLLEGE

EXPLORE ONLINE etown.edu/map

2025 Schedule

TIME	EVENT	LOCATION
11:30 a.m.–12:30 p.m.	Registration	Masters Center for Science, Engineering and Mathematics Lobby
	Lunch	Marketplace & KAV, Baugher Student Center/ Brossman Commons
12:45–12:55 p.m.	Welcome & Opening Remarks	Gibble Auditorium, Masters Center for Science, Engineering and Mathematics
ORAL SESSIONS		
1–2 p.m.	Oral Session #1	Gibble Auditorium, Masters Center for Science, Engineering and Mathematics
	Oral Session #2	Room 213, Hoover Center for Business
	Oral Session #3	Room 214, Hoover Center for Business
	Oral Session #4	Room 215, Hoover Center for Business
2:15–3:15 p.m.	Oral Session #5	Gibble Auditorium, Masters Center for Science, Engineering and Mathematics
	Oral Session #6	Room 213, Hoover Center for Business
	Oral Session #7	Room 214, Hoover Center for Business
	Oral Session #8	Room 215, Hoover Center for Business
3:30–4:30 p.m.	Oral Session #9	Room 213, Hoover Center for Business
	Oral Session #10	Room 214, Hoover Center for Business
	Oral Session #11	Room 215, Hoover Center for Business

POSTER SESSIONS		
1–2:00 p.m.	**Poster Session #1** 1–1:30 p.m.: Odd Numbers 1:30–2 p.m.: Even Numbers	Masters Center for Science, Engineering and Mathematics Atrium
2:15–3:15 p.m.	**Poster Session #2** 2:15–2:45 p.m.: Odd Numbers 2:45–3:15 p.m.: Even Numbers	Masters Center for Science, Engineering and Mathematics Atrium
PRIOR TO DEPARTURE		
4–5 p.m.	Light Refreshments	Masters Center for Science, Engineering and Mathematics Lobby

Oral Presentations

ORAL SESSIONS: 1–2 P.M.

ORAL SESSION #1

Location: Gibble Auditorium, Masters Center for Science, Mathematics and Engineering
Moderator: Dean Alan Utter

O1-01 Loss of Mettl3 Affects Spermatogenesis in Drosophila Melanogaster
Presenting Author(s): Cindy Chen
Additional Author(s): Layla Waldman, Susquehanna University

O1-02 Synthesis of Modified RNA Bases to be Used in Aptamer Drug Delivery Agents
Presenting Author(s): Imogen Jeffries
Additional Author(s): Aurora Pillars-Capoccia, Ashley Lozano, Dr. George Greco, Goucher College

O1-03 Synthesis of a 6-amino-5-triazolylpyridin-2(1H)-one PNA nucleobase (JTr) to improve PNA-RNA-RNA binding affinity and selectivity through pi-pi stacking
Presenting Author(s): Isabell Anderson, Elizabethtown College

ORAL SESSION #2

Location: Room 213, Hoover Center for Business
Moderator: Dr. Katie Caprino

O2-01 ELA Analysis of Curriculum and Benchmarks Within Different Districts
Presenting Author(s): Molly Kleinert, Elizabethtown College

O2-02 JayWing Academy: An AI-Powered Student Learning System Leveraging GPT in Cloud Infrastructure
Presenting Author(s): Joey Wagner, Kaiden Miller
Additional Author(s): Dr. Jessica Wang, Elizabethtown College

O2-03 Understanding Food Insecurity in Huntingdon County
Presenting Author(s): McKenzie Kapuschinsky
Additional Author(s): Lee Ann DeShong-Cook, Juniata College

ORAL SESSION #3
Location: Room 214, Hoover Center for Business
Moderator: Dr. Shannon Haley-Mize

O3-01 Unconventional Sexual Desires, Evolution, and Environmental Factors
Presenting Author(s): Lin Bangs, Elizabethtown College

O3-02 Committee Capacity in the United States Senate
Presenting Author(s): Zachary Kleinfelter, Elizabethtown College

O3-03 Depressing Time for Crime: How Huntingdon Daily Times Frames Victims & Offenders in 1933 news reporting
Presenting Author(s): Jezreel Ortiz, Juniata College

ORAL SESSION #4
Location: Room 215, Hoover Center for Business
Moderator: Dr. Diane Bridge

O4-01 Investigating the role of TGFβ signaling in changes of the cytoskeleton during regeneration of the zebrafish (Danio rerio) retina
Presenting Author(s): Sare King
Additional Author(s): Katie West, Goucher College

O4-02 Unmasking the Fungal Factor: The Overlooked Role of Fungi in CDI
Presenting Author(s): Dominick Watt, Selin Yalcinanahtar
Additional Author(s): Oscar Tuten, Manali Misra, Jeremy Chen See, Sierra Rossman, Brittney McMullen, Justin Wright, Dr. Regina Lamendella, Juniata College

O4-03 Does the Hydra vulgaris microbiome impact susceptibility to ferroptosis?
Presenting Author(s): Callie Elyse Asper
Additional Author(s): Dr. Diane Bridge, Elizabethtown College

ORAL SESSIONS: 2:15–3:15 P.M.

ORAL SESSION #5
Location: Gibble Auditorium, Masters Center for Science, Mathematics and Engineering
Moderator: Dr. Brenda Read-Daily

O5-01 Do Professional Baseball Players Play Minimax?
Presenting Author(s): Emma Nasados, Elizabethtown College

O5-02 Defect Driven Phase Engineering of 2D Silver
Presenting Author(s): Zachary Henshaw
Additional Author(s): Dr. William Blades, Juniata College

O5-03 Communicating Consequential Land Use Issues: Coalition to Save Old Crow Versus Rutters
Presenting Author(s): Myles Miller
Additional Author(s): Robb Lauzon, Juniata College

ORAL SESSION #6
Location: Room 213, Hoover Center for Business
Moderator: Prof. Emily Frantz

O6-01 ARISE - An AI-powered Real-time Interactive Support for Exercise in Elderly Communities
Presenting Author(s): Alexander Roop, Aaron Frist
Additional Author(s): Dr. Peilong Li, Elizabethtown College

O6-02 Using Music Therapy to Assess Communication and Cognition in Older Adults
Presenting Author(s): Hannah Fletcher, Elizabethtown College

O6-03 Reimagining News Narratives through a Beaded, Interactive Structure to Test Empathy and Trust
Presenting Author(s): Münire Bozdemir, Kaleah Leisher, Juniata College

ORAL SESSION #7
Location: Room 214, Hoover Center for Business
Moderator: Dr. Jeff Rood

O7-01 Tuning Alloy Atoms for Corrosion Resistance
Presenting Author(s): Wenyi Li, Juniata College

O7-02 Disruption of G-quadruplexes by 6-thioguanine
Presenting Author(s): Edward Nuber
Additional Author(s): Dr. Stephen Dunham, Moravian University

O7-03 Emergence of Magnetism in Two Dimensions
Presenting Author(s): Kay Peli
Additional Author(s): Dr. William Blades, Juniata College

ORAL SESSION #8
Location: Room 215, Hoover Center for Business
Moderator: Dr. Diane Bridge

O8-01 Simon Says Plant This!
Presenting Author(s): Simon Ramsey, Juniata College

O8-02 The effects of hypoxia on ferroptosis in Hydra
Presenting Author(s): Kira Koutsouftikis
Additional Author(s): Dr. Diane Bridge, Elizabethtown College

O8-03 Using genetically modified Hydra vulgaris to investigate the relationship between Wnt/β-catenin signaling and the inhibitory protein Axin
Presenting Author(s): Nicholas Kuhn
Additional Author(s): Dr. Diane Bridge, Elizabethtown College

ORAL SESSIONS: 3:30–4:30 P.M.

ORAL SESSION #9
Location: Room 213, Hoover Center for Business
Moderator: Dr. Amy Defnet

O9-01 Weeds in the City: The Effects of Urbanization on Plant Traits
Presenting Author(s): Brandon Puckett
Additional Author(s): Elise Shattuck, Akana Noto, Goucher College

O9-02 Intraspecific trait variation in urban and rural "weeds"
Presenting Author(s): Elise Shattuck
Additional Author(s): Brandon Puckett & Akana Noto, Goucher College

O9-03 Dendrotelmata: The Microecosystem You've Never Heard Of
Presenting Author(s): Brett Russotto, Juniata College

ORAL SESSION #10
Location: Room 214, Hoover Center for Business
Moderator: Dr. Jodi Lancaster

O10-01 The Prospect for Freedom -The Life & Legacy of Civil Rights Leader W. Miller Barbour (1908-1957) Elizabethtown College Class of 1932 A Documentary
Presenting Author(s): Mechelle Johnson-Reeves, Ava Barton
Additional Author(s): Prof. Jean-Paul Benowitz, Elizabethtown College

O10-02 Defining the Experience of Diversity at Elizabethtown College
Presenting Author(s): Kalen Tendo
Additional Author(s): Ms. Rachel Grove Rohrbaugh, Elizabethtown College

ORAL SESSION #11
Location: Room 215, Hoover Center for Business
Moderator: Dr. Jean Pretz

O11-01 How Do Academic Achievement and Creativity Predict Satisfaction and Meaning in Life?
Presenting Author(s): Melany Bedoya
Additional Author(s): Dr. Jean Pretz, Elizabethtown College

O11-02 Linking Environmental Policy to Alzheimer's Disease Burden: A Comparative State-Level and Patient-Level Analysis Using ADNI Data
Presenting Author(s): Manali Misra, Snabu Neupane
Additional Author(s): Dr. Tia Warrick, Juniata College

Poster Sessions

POSTER SESSION #1: 1–2 P.M.

Location: Masters Center for Science, Engineering and Mathematics Atrium
1–1:30 p.m. Odd Numbers | 1:30–2 p.m. Even Numbers

P1-01: "It's Gettin' Hot In Here": The Impact of Thermal Effluent on Atypical Rivers
Presenting Author(s): Eric Belfanti
Additional Author(s): Dr. Samya Bano Zain, Susquehanna University

P1-02: Assessing Tick-Borne Disease Risk: A Study of Tick Prevalence Throughout High-Traffic Trails in Huntingdon County
Presenting Author(s): Sarah Halteman, Juliana Onuskanich, Ashley Robuck, Lydia Seltzer
Additional Author(s): Dr. Jill Keeney, Dr. Regina Lamendella, Juniata College

P1-03: Effects of vegetation structure on songbird nest success in wooded urban habitats differ from those observed in forest patches.
Presenting Author(s): Nahida Sultana Mim, Rawasi Aljamal, Goucher College

P1-04: Evaluating baselines of seasonal phenologies and applications of the data in education and citizen science.
Presenting Author(s): Addison Bert
Additional Author(s): Brayden Todd, Samantha Moyer, Thomas J Firneno, Juniata College

P1-05: The Impact of Polyethylene Microplastics on Perfluoroalkyl Sulfonic Acids Adsorption in Soil
Presenting Author(s): Azhar Tanat, Goucher College

P1-06: Impact of polyethylene microplastics on the adsorption capacities of perfluoroalkyl substances in soil using liquie chromatography - mass spectroscopy
Presenting Author(s): Madison Spiers
Additional Author(s): Dr. Rebekah Gray, Goucher College

P1-07: Improving solid phase extraction (SPE) recovery of perfluoroalkyl substances (PFAS) for detection in rainwater
Presenting Author(s): Mariam Abdelrady
Additional Author(s): Dr. Rebekah Gray, Goucher College

P1-08: Investigating the Microbial Biotransformation of Per- and Polyfluoroalkyl Substances (PFAS) in AFFF-Contaminated Soils
Presenting Author(s): Rachael A. Filip
Additional Author(s): Justin R. Wright, Dr. Charles E. Schaefer Jr., Dr. John F. Stults, Dr. Linda S. Lee, Dr. Youn Jeong Choi, and Dr. Regina Lamendella, Juniata College

P1-09: Unmasking Fungal Contributions to Clostridioides difficile Infection: Insights from Multi-Omics and Predictive Modeling
Presenting Author(s): Manali Misra, Oscar Tuten
Additional Author(s): Sierra Rossman, Justin Wright, Selin Yalcinanahtar, Dom Watt, Dr. Kim Roth, Dr. Regina Lamendella, Juniata College

P1-10: Decomposition Rates of Common Saprotrophic Basidiomycotic Fungi in Central Appalachia
Presenting Author(s): Annie Ketterman, Juniata College

P1-11: Shifts in Small Mammal Community Composition Following 50 years of Forest Succession at Raystown Lake
Presenting Author(s): Kara Scotti
Additional Author(s): Joseph Walsh, Mr. Eric Quallen, Juniata College

P1-12: Estimating the Size and Cost of a Geothermal System for Founders Residence Hall
Presenting Author(s): Pedro Menezes de Castro Miranda
Additional Author(s): Dr. Brenda Read-Daily, Elizabethtown College

P1-13: From Aisle to Apiary: Analyzing the Chemical Profiles of Store-Bought and Local Honey
Presenting Author(s): Ella Powers, Elizabethtown College

P1-14: Effects of Kinase Inhibitors on A549 Cell Viability & Protein Expression for Lung Cancer Treatment
Presenting Author(s): Samantha L. Small
Additional Author(s): Kellie Simon, Spencer Mefford, Elizabethtown College

P1-15: Investigation of 2AP1 Protein Function and Optimal Conditions
Presenting Author(s): Kellie Simon
Additional Author(s): Spencer Mefford, Samantha Small, Dr. Amy E. Defnet, Elizabethtown College

P1-16: Exploring how atrazine exposure affects levels of matrix metalloproteinases in Danio rerio (zebrafish) embryos
Presenting Author(s): Kourtney Douglas
Additional Author(s): Daniela Harvey, Dr. Jenny Lenkowski, Goucher College

P1-17: Investigating the Effects of a Ubiquitous Mettl3 Knockdown in Drosophila melanogaster During Spermatogenesis
Presenting Author(s): Layla Waldman
Additional Author(s): Dr. Antonio Rockwell, Susquehanna University

P1-18: Investigating the role of TGFβ signaling in changes of the cytoskeleton during regeneration of the zebrafish (Danio rerio) retina
Presenting Author(s): Katherine West
Additional Author(s): Sare King, Goucher College

P1-19: Sleepy Flies and Sticky Proteins: Tracking Parkinson's Like Symptoms in GBA-Deficient Drosophila"
Presenting Author(s): Regan L. Farringer
Additional Author(s): Dr. Kathryn A. Jewett, Juniata College

P1-20: The Effects of Heavy Metal Stress on Transgenerational Inheritance in Drosophila melanogaster
Presenting Author(s): Earianne Evangelista, Moravian University

P1-21: Determining the Function of YPR015C in Saccharomyces cerevisiae
Presenting Author(s): Ross Mahler
Additional Author(s): Gabriella Wagner, Susquehanna University

P1-22: The Biological Function of YPR013C (CMR3) in the Yeast Saccharomyces cerevisiae
Presenting Author(s): Gabrielle Wagner
Additional Author(s): Dr. Michael Parra, Susquehanna University

P1-23: GLP-1 Effects on Gut Microbiome
Presenting Author(s): Omkar Warke, Stephen Kataria and Tamir Tadesse,
Additional Author(s): Dr. Regina Lamendella, Juniata College

P1-24: The Wonderfully Understudied World of Protein: Understanding 3PU9
Presenting Author(s): Spencer Mefford
Additional Author(s): Dr. Amy E. Defnet, Elizabethtown College

P1-25: Incorporation of Luminescent Transition Metal Complexes into Metal-Organic Frameworks for Ion Sensing Applications
Presenting Author(s): Robert Lynch, Matthew Lamb, Elizabethtown College

POSTER SESSION #2: 2:15–3:15 p.m.

Location: Masters Center for Science, Engineering and Mathematics Atrium
2:15–2:45 p.m. Odd Numbers | 2:45–3:15 p.m. Even Numbers

P2-01: Can't teach an old rat a new trick: Do aged male rats learn extinction in a passive avoidance paradigm?
Presenting Author(s): Madison L. Spencer
Additional Author(s): James F. Briggs, Susquehanna University

P2-02: Linking Brain Structure to Age-Related Differences in Spoken Word Processing
Presenting Author(s): Makenna Snyder
Additional Author(s): Dr. Jennifer Wittmeyer, Elizabethtown College

P2-03: Structural Brain Correlates of Intrusive Memories Following Exposure to Distressing Events
Presenting Author(s): Chloe Haldeman
Additional Author(s): Dr. Jennifer Wittmeyer, Elizabethtown College

P2-04: The Best Handwriting Method to Avoid Cramping and Arthritis
Presenting Author(s): Arden Kiner, Elizabethtown College

P2-05: The Buyer's Remorse in Green Choices: A Cross-Cultural Analysis of Cognitive Dissonance in Sustainable Fashion (U.S. vs. China)
Presenting Author(s): Yuanyuan (Abby) Sunchen
Additional Author(s): Dr. Li Shen, Juniata College

P2-06: Developmental Staging of G. pennsylvanicus and G. firmus
Presenting Author(s): Bella Rose, Dr. Randy Bennett, & Dr. Thomas J. Firneno, Juniata College

P2-07: Ecological and Evolutionary Implications of Mobbing as an Anti-Predator Behavior
Presenting Author(s): Jesus Campos
Additional Author(s): Dr. Joshua Lord, Moravian University

P2-08: Finding out the mechanism behind mobbing
Presenting Author(s): Jillian Barrows, Moravian University

P2-09: Plasticity of Diapause in Hybridizing Field Crickets
Presenting Author(s): Kenneth Sorokie
Additional Author(s): Lauren Mahkovic, Rilee Connors, Dominique Amisial, Dr. Thomas J Firneno Jr. Juniata College

P2-10: Impact of academic and non-academic factors on student success and retention rates
Presenting Author(s): Bhuvi Ajmera, Jahnavi Patel, Ngoc Anh Khong, Juniata College

P2-11: Wings Up: Researching and Writing A History of Juniata College, 2001-2026
Presenting Author(s): Madison Seipp, Finn Thornhill, Juniata College

P2-12: Many Numbers: A multi-site exploration of early childhood numeracy
Presenting Author(s): Luke Ryan, Katherine Gruver
Additional Author(s): Jennifer Asmuth Ph.D., Susquehanna University

P2-13: Creating Meaningful Community Engagement at the Juniata College Museum of Art
Presenting Author(s): Andi Bradsher, Juniata College

P2-14: Model-Pool Driven Dataset Distillation for Architecture-Agnostic Generalization
Presenting Author(s): Venus Yan, Juniata College

P2-15: Characterization of Native American Pottery Sherds from the Isle of Que - Selinsgrove, PA Part 1
Presenting Author(s): Ainslee M. Binkley, EmmaLia Ciccarello
Additional Author(s): Dr. Jennifer M. Elick, Susquehanna University

P2-16: Characterization of Native American Pottery Sherds from the Isle of Que - Selinsgrove, PA Part 2
Presenting Author(s): Ainslee M. Binkley, EmmaLia Ciccarello
Additional Author(s): Dr. Jennifer M. Elick, Susquehanna University

P2-17: Marketing Across Borders: Reimagining Advertising in the U.S. and India
Presenting Author(s): Pratham Dhandhania, Juniata College

P2-18: Synthesis and characterization of palladium(II) complexes bearing Schiff-base ligands containing a pendant sulfur group.
Presenting Author(s): Joshua Dow
Additional Author(s): Dr. William G. Dougherty Jr., Susquehanna University

P2-19: Preparation of novel peptide nucleic acid nucleobases aimed at improving PNA-RNA2 triplex stability for RNA containing pyrimidine interruptions
Presenting Author(s): Arianna Lepratto, Jacqueline Hammond, Elizabethtown College

P2-20: Synthesis of Modified RNA Bases to be Used in Aptamer Drug Delivery Agents
Presenting Author(s): Aurora Pillars-Capoccia, Ashley Lozano
Additional Author(s): Imogen Jeffries, Dr. George Greco, Goucher College

P2-21: Material Shielding Efficiency using Desktop Detectors
Presenting Author(s): Eric Ranzan
Additional Author(s): Dr. Adam Hansell, Susquehanna University

P2-22: Effect of Different UV Light Sources on Plastic Oxidation
Presenting Author(s): Eden Rovner
Additional Author(s): Rebekah Gray, Goucher College

P2-23: Contemporary Formulation and Recreation of Song Dynasty Oil-Spotted Ceramics
Presenting Author(s): Mollie Feight, Juniata College

P2-24: Carbon Trapping in the Soda Kiln
Presenting Author(s): Kelsey Cover
Additional Author(s): Robert Boryk, Juniata College

List of Abstracts

ORAL PRESENTATIONS

O1-01: Loss of Mettl3 Affects Spermatogenesis in Drosophila Melanogaster
N6-methyladenosine (m6A) is a highly conserved post-translational RNA modification that is added by a methyltransferase complex, in which Mettl3 is the sole catalytic subunit. The absence of Mettl3 has been found to hinder development in various species, including Drosophila melanogaster, where its loss resulted in neuronal defects and impaired oogenesis. Although the role of Mettl3 in sperm development is less understood, we hypothesize that it may have a function in spermatogenesis as the gene has been linked to gametogenesis in previous studies. To investigate this, we used the GAL4/UAS system to ubiquitously knock down Mettl3 and assessed its effects on spermatogenesis using confocal microscopy. Knockdown of Mettl3 results in swollen apical tips with mislocalized hubs and muscle cells. These results suggest that Mettl3 may be required for proper spermatogenesis, possibly through the tsn pathway as tsn has Mettl3 binding sites and forms the secondary structure needed for Mettl3 to catalyze m6A. Given that the phenotypes of Mettl3 knockdowns differ from those of the controls, it is likely that Mettl3 plays an important role in Drosophila spermatogenesis.

Presenting Author(s): Cindy Chen
Additional Author(s): Layla Waldman **Susquehanna University**

O1-02: Synthesis of Modified RNA Bases to be Used in Aptamer Drug Delivery Agents
A drug delivery agent selectively binds to a biological target to allow a drug to enter and perform its function. Antibodies are commonly used for this purpose, but aptamers are an alternative that are non-immunogenic and easier to prepare. Aptamers are short single stranded DNA or RNA molecules under 70 nucleotides long that reproducibly fold into specific shapes and specifically bind to target proteins. One important application would be aptamers that selectively deliver a highly toxic drug to cancer cells without harming non-cancerous cells. A synthesis scheme was designed to prepare a modified uridine to be incorporated into an RNA aptamer. The objective is to add hydrophobic amino acid-like side chains—phenylalanine, naphthalene, and tryptophan—to the base to increase the structural diversity and allow for better target binding. The starting material for this synthesis has a methoxy group on the 2' carbon, which stabilizes the RNA and protects it from nucleases. The amino acid like side chain is added through a Pd-catalyzed coupling reaction, followed by addition of the triphosphate to complete the synthesis.

Presenting Author(s): Imogen Jeffries **Goucher College**
Additional Author(s): Aurora Pillars-Capoccia, Ashley Lozano, Dr. George Greco

O1-03: Synthesis of a 6-amino-5-triazolylpyridin-2(1H)-one PNA nucleobase (JTr) to improve PNA-RNA-RNA binding affinity and selectivity through pi-pi stacking
RNA is a vital biological molecule, serving many important roles. Coding RNA helps translate genetic information from DNA into proteins, while non-coding RNA has many functions such as gene regulation and catalyzing chemical reactions. However, certain types of noncoding RNA are not yet fully understood.

Regions of these noncoding RNAs form secondary structures, including double helices, which make them ideal targets for molecular recognition by triplex-forming oligonucleotides (TFOs). The MacKay group uses peptide nucleic acid (PNA) as a TFO due to its neutral charge and high stability and this strategy works well for purine-rich RNA strands. However, there is a lack of PNA nucleobases that can selectively recognize pyrimidines and form strong Hoogsteen hydrogen bonds with any RNA. One solution is to introduce aromatic heterocycles into existing purine-recognizing nucleobases to improve binding affinity through pi-pi stacking interactions with adjacent pyrimidine-recognizing nucleobases. This strategy has been employed using 5-triazolyl uracil (UTr) where the binding affinity of the PNA strand to double-helical RNA improves, but this only works if Adenine is adjacent to the pyrimidine. To improve the ability to recognize any strand of RNA, we aim to design a pi-stacking nucleobase that can recognize Guanine as well. This project involves adding a triazole group to the pseudoisocytidine (J) nucleobase for this purpose. Starting with 5-bromo-2-nitropyridine, a multi-step synthesis was designed toward the triazolyl J monomer (6-amino-5-triazolylpyridin-2(1H)-one or JTr). This presentation will discuss the steps taken thus far to prepare JTr. Some key steps in the synthesis include a malonate addition to the bromopyridine, iodination to functionalize the molecule for a Sonogashira coupling, oxidation to transform the pyridine ring into a pyridone, and an azide-alkyne cycloaddition to form the triazole. Once fully synthesized, the JTr base will be studied to evaluate its potential to enhance pi-stacking, binding affinity, and selectivity.

Presenting Author(s): Isabell Anderson **Elizabethtown College**

O2-01: ELA Analysis of Curriculum and Benchmarks Within Different Districts

This qualitative research project examined elementary English Language Arts curriculum materials being used in five different districts. This research is relevant to the education field today as ELA curriculums and materials used in the classroom are constantly changing. The researcher engaged in content analysis of the materials by coding first grade literacy curriculum materials for elements of Scarborough's Reading Rope. During the research process the three research questions that were the key focuses of the research included finding answers to what curriculums and benchmarks are currently being used within different school districts today, looking to see if connections exist between the ELA curriculums schools are using, and analyzing how the Reading Rope influences different ELA curriculums and benchmarks currently being used. A content analysis using the tenets of Scarborough's Reading Rope was conducted for first grade literacy curriculum materials from five districts/schools; some of the schools were private whereas others were public. Findings included students can engage in the Reading Rope through two different instructional methods, the terminology of the Reading Rope varies in how it is shown in the different curriculum materials, some ELA skills and content can fit into multiple strands of the Reading Rope, and certain curriculums have specific focuses so curriculums might need to be paired together. Directions for future research and implications for classroom practice will be shared.

Presenting Author(s): Molly Kleinert **Elizabethtown College**

O2-02: JayWing Academy: An AI-Powered Student Learning System Leveraging GPT in Cloud Infrastructure

Over the past few years, Large Language Models (LLM) such as ChatGPT, Gemini, and Claude have become widely used tools for academic assistance in college settings. However, students often use these tools as shortcuts for quick answers rather than as aids for meaningful learning. While LLMs offer insights based on extensive training data, they often fail to align with the instructor's pedagogical learning path and lack the interactive guidance provided by human tutors. To address this gap, we propose JayBot, a college-level AI Tutor that employs Retrieval-Augmented Generation (RAG) to generate responses grounded in course-specific materials uploaded by instructors. JayBot is designed to emulate the conversational, reasoning-based guidance of human tutors. Our approach incorporates few-shot prompting to deliver personalized and curriculum-aligned guidance, helping students work through problems with a Socratic questioning approach instead of immediately providing answers. Experimental results from Computer Science courses demonstrate that our method enhances instructional alignment by mitigating issues, such as premature exposure to advanced topics, instructional dilution, and answer over-disclosure of solutions. Meanwhile, professors are provided real-time insights into the questions their students are asking, allowing for personalized review sessions, AI abuse monitoring, and statistical insights. Results indicate that JayBot is capable of providing a more effective, personalized, and pedagogically sound AI tutoring experience.

Presenting Author(s): Joey Wagner, Kaiden Miller **Elizabethtown College**
Additional Author(s): Dr. Jessica Wang

O2-03: Understanding Food Insecurity in Huntingdon County

The USDA National Institute for Agriculture awarded a planning grant to the Center For Community Action to address food insecurity issues in Huntingdon County. As part of the application process for the grant a collaborative Food Council was formed to oversee the work and ultimately develop a five year strategic plan to address food needs in the area. According to reliable screening methods, 5.2 million (7.1%) older adults aged 60 and over experienced food insecurity in 2019, while an additional 2.6% (1.9 million) were categorized as having extremely low food security (Aday et al., 2022). Valid and trustworthy food security measurement is necessary for any type of food security study, program, and monitoring with regard to predetermined targets (Manikas et al., 2023). The focus of my research has been to collaborate with members of the Food Council to develop and disseminate a food insecurity survey to inform their future strategic planning work. I will share progress to date including survey development and testing processes, dissemination strategies. The importance of engaging and empowering community stakeholders when conducting survey research will be highlighted.

Aday, R. H., Wallace, J. B., Jones, S. C., Pogacsnik, A. R., Leifker, K. F., & Kibe-Pea, E. W. (2022). Understanding the Experiences of Food Insecurity in Older Adult Households. Journal of Gerontological Social Work, 66(2), 239–262. https://doi.org/10.1080/01634372.2022.2098443

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Presenting Author(s): McKenzie Kapuschinsky **Juniata College**
Additional Author(s): Lee Ann DeShong-Cook

O3-01: Unconventional Sexual Desires, Evolution, and Environmental Factors

Over the last decades, researchers have attempted to understand core motivations for engaging in alternative sexual practices, like sexual hierarchical imbalances—or power exchange. Research has pointed to numerous avenues for explanations, such as mating strategies, imprinting, classical conditioning, sexual orientation, trauma, and much else. At present, little is known about the impact socialization may have on these behaviors. We suggest a biopsychosocial approach will be supported by existing research and findings from this study's survey results. Thus far, over 250 participants have completed the survey, which focused on analyzing how life stress and control may influence the arousal of sexual hierarchical disparities. With the contribution of the present study's findings, we aim to formulate a comprehensive analysis that will add a piece to the puzzle that researchers have tried to solve for years.

Presenting Author(s): Lin Bangs **Elizabethtown College**

O3-02: Committee Capacity in the United States Senate

When a political party gains majority party control of the Senate, it also assumes primary authority over the Senate's many committees and subcommittees. Committees, which are organized by policy topic, play a central role in shaping legislation in each policy area. When a party gains control, it can replace some of the committee staff with new, more loyal staffers. Using Senate telephone directories from the 1970s to the present, this research examines whether political parties prioritize political control of certain committees over others by examining patterns of staff turnover following shifts in Senate majority party status. We hypothesize that the most influential committees, known as "super A" committees, will see consistently higher staff turnover than other committees across time and regardless of which party is in control. By comparing transitions in partisan control across multiple decades, this study identifies whether a core set of committees is persistently targeted for partisan restructuring and seeks to fill a gap in the literature about the importance of committee staff and their susceptibility to politicization. Results have implications for better understanding legislative strategy and reasons for congressional dysfunction in the modern era.

Presenting Author(s): Zachary Kleinfelter **Elizabethtown College**

O3-03: Depressing Time for Crime: How Huntingdon Daily Times Frames Victims & Offenders in 1933 news reporting

Language and how we frame people in the media has a great influence on societal reactions. Few groups are as deeply affected by the media as criminal offenders and their victims. The media shapes narratives of crime, fuels moral panics, and represents political and cultural shifts. While prior studies have examined offender and victim framings, little has been conducted looking at how these framing emerged

historically. Additionally, most research of this kind utilizes large national newspaper or large metropolitan city newspaper sources. Specifically, this study draws on news stories featured in the headlines of the Huntingdon Daily Times from the year 1933. To conduct the analysis, front page stories were collected and qualitatively coded to assess themes witnessed in the stories. The study assessed changes in journalistic language, tone, and imagery, along with the rise of sensationalism, moral panics, and the public's waning faith in the criminal justice system. The results highlight how local rural newspapers like the Huntingdon Daily Times can shape perceptions of offenders and victims not only in the past, but currently. Through a criminal justice perspective, this study revisits historical media to enhance our understanding of how crime-related narratives and policy decisions have evolved.

Presenting Author(s): Jezreel Ortiz **Juniata College**

O4-01: Investigating the role of TGFβ signaling in changes of the cytoskeleton during regeneration of the zebrafish (Danio rerio) retina

Zebrafish (Danio rerio) can completely regenerate their retinal neurons when they are damaged. Müller glial (MG) cells are activated after damage has occurred and act as tissue-specific stem cells. Mammalian MGs do not have this ability and instead exhibit reactive gliosis after retinal damage, leading to the formation of a glial scar and impaired vision. The TGFβ signaling pathway plays a key role in both processes, likely coming into play early in the damage response. Downregulation of TGFβ signaling after the initial response may allow regeneration to occur, while upregulation decreases or fully inhibits regeneration and causes a glial scar. This study aims to characterize expression and localization of cytoskeletal elements in the MG to determine if they are differently expressed when TGFβ signaling is manipulated. We performed a retinal photoreceptor lesion on adult zebrafish with truncated forms of key proteins that regulate or are regulated by the TGFβ pathway to further explore its role in regeneration. MG were visualized with fluorescence microscopy to determine the differences in the regenerative ability of zebrafish with those truncated genes as compared to non-mutant fish.

Presenting Author(s): Sare King **Goucher College**
Additional Author(s): Katie West

O4-02: Unmasking the Fungal Factor: The Overlooked Role of Fungi in CDI

Clostridiodes difficile infections (CDI) have been elevated to an urgent health threat by the Centers for Disease Control because this pathogen kills more than 100,000 Americans each year. There is limited knowledge about the impacts of C. difficile on the rest of the gut microbiome, particularly regarding its interactions and effects on the gut mycobiome (fungal consortia). In this study, we will determine the extent of interactions between the fungi in the gut and the pathogen C. difficile, whether fungi influence the severity of a CDI infection, and if it increases the possibility of recurrence. Using matched shotgun-metagenomics (total DNA profiling) and metatranscriptomics (RNA profiling) on n=100, de-identified stool samples from tertiary referral centers, we compared the abundance of bacterial and fungal taxa and genes in CDI+ and CDI- individuals. Bioinformatics analysis is being performed to annotate taxa, genes, pathways, and predicted metabolites in CDI+ and CDI- cohorts. We hypothesize that the fungal and bacterial features will differentiate CDI+ from CDI-negative stools. Furthermore, we expect strong co-occurring interactions between fungi and C. difficile in CDI+ samples. Our preliminary human and mouse studies revealed a higher abundance and diversity of fungal taxa in CDI+ specimens. Differential abundance analysis revealed distinct metabolic signatures between groups, and highlighted significant shifts in bile acids, amino acid derivatives and other small molecules. Future directions will focus on identifying differentially abundant fungi, bacteria, and microbial genes to better understand their functional roles in the pathogenesis of CDI infections.

Presenting Author(s): Dominick Watt and Selin Yalcinanahtar **Juniata College**
Additional Author(s):Oscar Tuten, Manali Misra, Jeremy Chen See, Sierra Rossman, Brittney McMullen, Justin Wright, Regina Lamendella

O4-03: Does the Hydra vulgaris microbiome impact susceptibility to ferroptosis?

Hydra vulgaris is an invertebrate species used in research on development and host-microbe interactions. Ferroptosis is a form of iron-dependent regulated cell death involving lipid peroxidation. Abnormal regulation of ferroptosis has been implicated in neurodegenerative diseases and cancer. This project uses H. vulgaris as an experimentally convenient model in which to study the impact of the microbiota on ferroptosis. Bacterial taxa known to be present in the H. vulgaris microbiota affect iron availability and lipid peroxidation. However, the impact of the H. vulgaris microbiome on susceptibility to ferroptosis

has yet to be studied. To address this, H. vulgaris were treated with a combination of antibiotics to yield "germ-free" organisms. Germ-free Hydra and Hydra that still had their original microbiota were treated with the ferroptosis inducer diethyl maleate (DEM). Germ-free Hydra had significantly lower survival rates at 20 and 24 hours of DEM treatment compared to the Hydra that still possessed their microbiomes. To determine the effects of individual bacterial taxa on ferroptosis, cultures of five different types of bacteria present in normal H. vulgaris were established. Germ-free Hydra were then inoculated with individual types of bacteria and tested to ensure that only one type of bacteria was present. In future experiments, Hydra with each individual bacterial type, germ-free and normal Hydra will all be treated with DEM and another ferroptosis inducer, and survival rates will be compared. DNA has been extracted from each type of bacteria to allow identification of each type based on the sequence of the 16S ribosomal RNA gene.

Presenting Author(s): Callie Elyse Asper **Elizabethtown College**
Additional Author(s): Dr. Diane Bridge

O5-01: Do Professional Baseball Players Play Minimax?

This project explores whether professional baseball players' decisions are consistent with mathematical game theory. More specifically, do pitchers choose to throw fastballs or off-speed pitches at the right times, and do batters choose to swing at the right times? The payoff for each choice is On-Base Plus Slugging (OPS), and solutions are conditioned on the pitch count. We determine how optimal strategies for both pitcher and batter differ with pitch count, and, using a large dataset with nearly 750,000 at-bats, we find that neither pitchers nor batters behave optimally.

Presenting Author(s): Emma Nasados **Elizabethtown College**

O5-02: Defect Driven Phase Engineering of 2D Silver

At length scales 1/1,000,000th the width of a human hair, materials behave strangely with potentially powerful properties. This phenomenon makes nanoscience, and the study of 2-dimensional (2D) materials, increasingly important in technological advancement. Our research focuses on 2D-Ag grown on a SiC substrate capped with graphene that facilitates the formation of the 2D-metal layer, which altogether forms a SiC/2D-Ag/graphene heterostructure. Experimentally, the heterostructure's 2D-Ag layer is observed to exist in two phases: a semiconducting phase (Ag1) and a metallic phase (Ag2). The relative phase amounts can vary depending on growth conditions, and a phase transition (Ag1->Ag2) is observed over time. This behavior suggests there is an interplay between kinetic and thermodynamic driving forces during formation. For example, during synthesis, defects are introduced to the graphene layer by etching the surface with various plasma treatments, allowing Ag atoms to intercalate beneath. This etching process can modulate key kinetic barriers, such as diffusion and step-edge energies (Ehrlich–Schwoebel barriers), which influence the formation of the 2D-Ag layer. To get a better understanding of the quantum chemical behavior of this process, we will use density functional theory (DFT) to characterize the atomic-scale electronic and geometric properties of the heterostructure. Additionally, our structural and energetic DFT data will be used to inform molecular dynamics (MD) calculations, helping us better understand the Ag phase expression observed experimentally. These data will be adopted to model the synthesis process, with the goal of identifying the specific pathways and defect conditions that favor one phase over the other. This work will enable a deeper insight into 2D-metal heterostructure systems and inform the phase engineering of this material class for future advanced technical applications.

Presenting Author(s): Zachary Henshaw **Juniata College**
Additional Author(s): Dr. William Blades

O5-03: Communicating Consequential Land Use Issues: Coalition to Save Old Crow Versus Rutters

Beginning in 2018, Rutter's gas station showed interest in building a truck stop on the plot of land next to the Old Crow Wetland. In 2022, the Coalition to Save Old Crow Wetland was formed. The Coalition wrote letters to the editor of the Huntingdon Daily News, made educational videos, stuck signs in their yard, and attended a variety of events including meetings for the DEP & Smithfield Township supervisors to speak out about the dangers of the truck stop's construction. The group was able to delay construction until February 1, 2025 when they withdrew their final appeal and Rutter's was approved to build. Data for this project was collected using rhetorical field methods. Rhetorical field methods utilize a method of emplacement whereby the researcher situates themselves within the environment of the experiential text. In this instance, the text was the community where the controversy surrounding Old Crow Wetland

and the proposed Rutter's was actively being deliberated. Interviews, news articles, photographs, postings on social media (video, text, images), and ephemera were collected for analysis. Additionally, field observations were made using ethnographic jottings. All this information contributed to a grounded approach to rhetorical theory. This analysis offers three videos and a collection of written text to highlight the power of delivery in environmental communication. Specifically, I am looking at the nonverbal and verbal characteristics of videos and how those multiple cues generate greater liking between the Smithfield Township community and opponents of the proposed Rutter's. This paper argues that the increased richness of multimedia is persuasive, and that shifting the delivery method of the message is meaningful for advocating for environmental issues in localized contexts. In other words, I believe written communications are misconstrued by community members. This effect can be seen in other contentious areas across social media.

Presenting Author(s): Myles Miller **Juniata College**
Additional Author(s): Robb Lauzon

O6-01: ARISE - An AI-powered Real-time Interactive Support for Exercise in Elderly Communities

The increasing global elderly population necessitates innovative solutions for accessible at-home healthcare and wellness. This paper introduces ARISE (Adaptive Real-time Interactive System for Exercise), an AI-powered system designed to provide safe, personalized exercise guidance for elderly individuals, focusing on improving mobility and reducing fall risks. ARISE features a multimodal interaction framework that fuses real-time computer vision for pose estimation with voice-based conversational AI to provide accurate, context-aware feedback. To meet mission-critical timing requirements, ARISE is deployed on a heterogeneous edge platform combining a Raspberry Pi 5 CPU with a Hailo-8 NPU for hardware-accelerated inference. Additionally, the system incorporates an elderly-friendly interface with gamified exercise modules to enhance user engagement, particularly for individuals with limited mobility. Experimental results demonstrate the feasibility of ARISE as an inclusive, low-cost, and responsive platform for promoting physical activity and safety in home environments.

Presenting Author(s): Alexander Roop, Aaron Frist **Elizabethtown College**
Additional Author(s): Dr. Peilong Li

O6-02: Using Music Therapy to Assess Communication and Cognition in Older Adults

This project focuses on music therapy assessment tools and techniques used in the local community to assess and evaluate older adult populations. Professional music therapists (MT-BCs) work with a wide range of clients, and assessment is one of the first major steps in determining treatment plans and therapeutic goals. This project aims to understand the process behind assessing older adult clients and determine the level of formal assessment used frequently in the community. After a brief definition of music therapy, the presentation will discuss the client-centered goals of music therapy treatment in cognition and communication domains and emphasize the educational value of standardized assessments. The presenter will also engage the audience in a brief demonstration of instrument-playing assessment techniques used to measure sequence memory and pattern recognition. Through semi-structured interviews conducted by the presenter with MT-BCs at Masonic Village and Penn State Hershey Medical Center, the presenter aims to use qualitative data coding analysis to highlight the importance of music therapy assessment and begin laying the groundwork for the development of an assessment form for future clinical use.

Presenting Author(s): Hannah Fletcher **Elizabethtown College**

O6-03: Reimagining News Narratives through a Beaded, Interactive Structure to test Empathy and Trust

This study explores the relationship between interactivity, empathy, and trust in narrative news articles. While previous research has investigated how different media such as games, advertisements, and immersive story-worlds, evoke empathy through narrative transportation, the potential of interactivity to generate empathy and trust in journalistic storytelling remains underexplored. Our aim is to assess how interactivity influences readers' empathy and trust, particularly in news stories designed to foster global understanding of significant issues—in the case of our study, plastic pollution. To do this, we selected a digital tool to restructure an existing news article using interactive elements. The interactive version of the article adopts a yo-yo (beaded) narrative structure, which preserves a coherent narrative spine while offering the reader meaningful decision points. This structure is intended to allow readers to exercise agency without fragmenting the story, encouraging deeper emotional and cognitive engagement. Participants, who

are volunteer college students from USA, are exposed to the interactive and the traditional/linear version of the news story to help us answer the following research questions: 1. Does an interactive news story elicit higher levels of emotional or cognitive empathy than a traditional version? 2. How do interactive elements influence readers' attitudes or opinions toward the issue? 3. How do readers describe their subjective experience of empathy and attitude change across formats? Reader responses are evaluated using adapted versions of the State Empathy Scale (Shen, 2010), the Transportation Scale Short Form (Appel et al., 2015), and the News Trust Scale (Kohring & Matthes, 2007). Findings aim to offer insights into how narrative design can foster deeper emotional engagement and credibility in news reporting on complex global issues.

Presenting Author(s): Münire Bozdemir, Kaleah Leisher **Juniata College**

O7-01: Tuning Alloy Atoms for Corrosion Resistance

In oxidative environments, metals (e.g., nickel) can be alloyed with certain elements (e.g., chromium) to help facilitate the formation of a passivating oxide film, protecting the alloy surface from further corrosion. The formation of this protective layer can occur more rapidly depending on the distribution of the alloying elements, which affects phenomena such as the adsorption behavior of oxygen at the surface. To clarify how the arrangement of Cr on the surface affects oxygen adsorption behavior (indirectly influencing the initial growth of the passivation film), we used density functional theory (DFT). For elemental Ni(111), our results show that oxygen atoms prefer to adsorb at hollow sites on the surface. To better understand how the distribution of Cr (i.e., short-range order) affects this adsorption behavior, we introduced Cr into the Ni lattice at various surface sites. Our DFT results show that oxygen adsorption near the Cr atoms enhances O binding strength. This enhancement increases when Cr atoms are clustered (i.e., two Cr atoms as nearest-neighbor pairs), while the ordered structure (two Cr atoms with only Ni atoms as their nearest neighbors) does not exhibit the same degree of enhancement in oxygen adsorption. These data will serve as a foundation to investigate how Cr surface concentration and short-range order enhance adsorption and promote the formation of stable oxides on transition-metal alloy surfaces.

Presenting Author(s): Wenyi Li **Juniata College**

O7-02: Disruption of G-quadruplexes by 6-thioguanine

The nitrogenous base guanine can be modified with a sulfur to become 6-thioguanine. This new molecule is a cytotoxin that is especially lethal to cancer cells. While its effectiveness as an anti-cancer drug is known, the reason behind 6-thioguanine's effectiveness is unclear. Some hypothesize that it disrupts the shape of the DNA in a way that particularly harms cancer cells. A guanine rich structure that is important to cancer cells are telomeres. Telomeres act as protective caps at the end of chromosomes to maintain the integrity of the useful DNA during replication. Each time a cell replicates a bit of these telomeres are removed. When there are no more telomeric repeats the cell triggers programmed cell death. However, some cancer cells extend these telomeres which prevents the cells from getting the internal trigger to die. Telomeres have a section that forms a structure known as a G-quadruplex. It is hypothesized that 6-thioguanine disrupts the structure of the G-quadruplex. The structure and stability of G-quadruplexes can be determined by several types of spectroscopy. The goal of this project is to use fluorescence spectroscopy and circular dichroism to determine if 6-thioguanine disrupts G-quadruplexes.

Presenting Author(s): Edward Nuber **Moravian University**
Additional Author(s): Dr. Stephen Dunham

O7-03: Emergence of Magnetism in Two Dimensions

Monolayer (ML) metals exhibit unique magnetic phenomena distinct from their bulk counterparts, leading to properties desirable in spintronics and potential implementation into the design of quantum computers. While experimental growth of these low-dimensional magnetic materials remains aloof, typical synthesis conditions involves using SiC substrates, which act as stable support templates for the ML. Specifically, if a magnetic monolayer-Fe (ML-Fe) was synthesized on top of a SiC substrate, the ML-Fe surface would bond at different adsorption sites and mimic a "strained" single-layer gamma-Fe(111) face. To better understand the magnetic properties of ML-Fe on such a substrate, we employ first-principles calculations using density function theory (DFT) implemented in the QuantumATK software package. These methods are used to calculate the electronic structure of i) bulk gamma-Fe(111), ii) isolated ML-Fe, and iii) SiC/ML-Fe structures. To appreciate the effect of strain on the magnetic properties, we apply compressive and tensile strains to the lattice of the bulk and isolated materials. Our results show that as tensile strain increases, there is an increase in the

magnetic moment of the materials. The origins of this quantum-chemical change were probed by calculating the Projected Density of States (PDOS), where a shift in the overall d-band center and a split between the spin-up and spin-down channels of the d-electrons was observed. This response suggests that as strain is increased, there is a change in exchange splitting, which induces a higher average magnetic moment per atom. These data help us better understand the emergence of magnetism in ML transition metal materials and offer a scalable platform where these intrinsic properties can be probed experimentally.

Presenting Author(s): Kay Peli **Juniata College**
Additional Author(s): Dr. William Blades

O8-01: Simon Says Plant This!

Despite growing interest in ecological restoration and sustainability, accessible information about native plants remains surprisingly limited. Simon Says Plant This is a website designed to raise awareness of native species and provide a user-friendly tool for planning landscaping projects that support local ecosystems. The platform offers a modern, interactive experience with features such as user-generated plant lists and an ecoregion-based map, helping users make informed, ecologically responsible gardening decisions. By simplifying the process of selecting native plants, our goal is to empower more individuals to create gardens that contribute meaningfully to a more sustainable and biodiverse world.

Presenting Author(s): Simon Ramsey **Juniata College**

O8-02: The effects of hypoxia on ferroptosis in Hydra

Ferroptosis is a form of iron-dependent regulated cell death caused by accumulation of lipid peroxides. It is implicated in cell death occurring due to low tissue oxygen levels when blood flow is reduced during stroke and cardiac events. Invertebrate species have provided valuable insights into this medically important process. Past Elizabethtown College students have characterized the responses of the invertebrates Hydra vulgaris and Hydra oligactis to compounds which induce and inhibit ferroptosis. However, it is not clear what conditions normally lead to ferroptosis in these species or whether Hydra ferroptosis may have unique features reflecting the conditions of the normal environment of Hydra. In the freshwater lakes and ponds where these species are found, dissolved oxygen levels and iron availability vary substantially. The goal of this project is to investigate the effects of low dissolved oxygen concentration on ferroptosis in Hydra. To decrease the concentration of dissolved oxygen, Hydra medium was purged with nitrogen and kept in a low oxygen environment. Responses of Hydra to the ferroptosis inducer diethyl maleate under low oxygen and normal conditions were compared. Three species of Hydra differing in response to temperature stress and in dispersal behavior have been included in these experiments.

Presenting Author(s): Kira Koutsouftikis **Elizabethtown College**
Additional Author(s): Dr. Diane Bridge

O8-03: Using genetically modified Hydra vulgaris to investigate the relationship between Wnt/β-catenin signaling and the inhibitory protein Axin

Wnt/β-catenin cell signaling plays important roles in embryonic development, homeostasis of normal adult tissues, and its dysregulation is implicated in many types of cancer. Wnt/β-catenin signaling pathways are evolutionarily conserved, making the well-studied invertebrate Hydra an ideal, simple model to use in investigating this system. Wnt induces its own production, creating a positive feedback loop. Axin is an intracellular scaffolding protein which inhibits effects of Wnt. This project aims to determine whether Wnt production is limited within tissues by up-regulation of Axin expression by Wnt itself, implying a negative feedback function. This study uses Hydra vulgaris that have been genetically modified to produce green fluorescent protein (GFP) in cells where Axin is actively transcribed, allowing visualization of Axin expression. The effect of Wnt signaling duration on Axin expression was assessed by observing regenerating animals. Upon animal bisection, strong upregulation of Axin was detected in the regenerating head but not in the regenerating peduncle, indicating that transient Wnt expression in the peduncle does not upregulate Axin while constant Wnt expression in the head does. Hydra spheroids were used to demonstrate that tissue blocked from regenerating in an isotonic solution also have blocked Axin expression. To determine which Wnt ligand is responsible for Axin upregulation animals were decapitated and exposed to a JNK inhibitor known to upregulate Wnt3 and downregulate Wnt9/10c. Results suggest that Wnt3 alone is not sufficient to cause Axin expression.

Presenting Author(s): Nicholas Kuhn **Elizabethtown College**
Additional Author(s): Dr. Diane Bridge

O9-01: Weeds in the City: The Effects of Urbanization on Plant Traits
Urbanization causes a variety of environmental changes such as elevated temperatures, varying soil nutrient concentrations, and fragmentation. As a result, these environments can alter the way plants grow, potentially through adaptation or phenotypic plasticity. This project seeks to understand the differences in phenotypic traits across an urbanization gradient determined by impervious cover as well as the mechanisms that lead to these differences. To do this, we planted a common garden experiment using seeds of five common herbaceous weed species from four sites each, across an urbanization gradient. The gardens were placed in an urban and a non-urban site to determine whether phenotypic differences would be observed in these species, as well as if these differences are due to adaptation or phenotypic plasticity. In addition, we conducted a germination experiment in the lab using seeds from the same species and sites under two different temperatures to simulate the temperature difference between an urban and rural site. The common garden is an ongoing experiment that will continue throughout the fall, while preliminary results from the germination study suggest that urban seeds may be germinating earlier than their non-urban counter parts. Through the use of ubiquitous weeds, which are already adapted to unfavorable conditions, this study will help to determine the extent that urbanization affects plant traits.

Presenting Author(s): Brandon Puckett **Goucher College**
Additional Author(s): Elise Shattuck, Akana Noto

O9-02: Intraspecific trait variation in urban and rural "weeds"
Urbanization impacts biotic and abiotic conditions, such as inter- and intraspecific competition, temperature, and soil nutrients, among others. These factors are all important for plant growth, and urbanization may therefore enact selective pressures on plant traits. Studying intraspecific trait variation along an urbanization gradient can provide insight into the effects of urbanization on plant populations. The current study focuses on the effects of urbanization on traits of several common "weed" species in the Baltimore metropolitan area. We conducted an observational study of six focal species at eight sites, including parks and roadsides, across an impervious cover gradient. For each plant, we measured their maximum height, specific leaf area (SLA), and aboveground biomass. We hypothesized that plants grown in urban environments would exhibit greater maximum height and aboveground biomass, and lower SLA (decreased surface area relative to leaf mass) than those grown in rural environments. We found that plants grown in urban environments exhibited decreased height in some, but not all, species, which is inconsistent with our hypothesis. Aboveground biomass and SLA data are still being collected and analyzed. This research on intraspecific variation in plants could improve our understanding of how plant phenotypes respond to urbanization over time, particularly in plants, like these "weeds," that are more tolerant of urbanization.

Presenting Author(s): Elise Shattuck, **Goucher College**
Additional Author(s): Brandon Puckett & Akana Noto

O9-03: Dendrotelmata: The Microecosystem You've Never Heard Of
Dendrotelmata are tree holes that fill with water, many of which host various species of insects and insect larvae. Much of the ecology of these micro-ecosystems is yet to be discovered. For example, little information exists on what species use these holes. Given the potential importance of these micro-ecosystems as habitats in isolated areas within forests, understanding what insects use these holes and those insects' trophic dynamics are important. The aim of this study is to find out what insects use these holes and attempt to create food webs for these ecosystems. So far, most of the organisms that have been found are typically disliked by humans, such as mosquitoes and biting midges. However, other insects found such as beetle and drone fly larvae show that these holes host other species that are more well liked and beneficial to the larger forest ecosystems as prey species. Thus, while it may seem tempting to write these holes off as places where mosquitoes breed and nothing more, caution should be taken with this approach, as universal removal of trees containing dendrotelmata could lead to larger, unforeseen ecological effects.

Presenting Author(s): Brett Russotto **Juniata College**

O10-01: The Prospect for Freedom -The Life & Legacy of Civil Rights Leader W. Miller Barbour (1908-1957) Elizabethtown College Class of 1932 A Documentary
Honors Students Journey in Documentary Making Ava Barton and Mechelle Reeves-Johnson are two Stamps Scholars in the honors program at Elizabethtown College with extensive experience in short film

production, their films have received national and international awards. Together they collaborated in making a short film about the nationally acclaimed civil rights activist, W. Miller Barbour (1908-1957) Elizabethtown College Class of 1932. This film screening and presentation will illustrate their journey in documentary filmmaking. Both students will share how they learned the importance of collaboration with each other and their documentary subjects, to think creatively, pushing through diverse challenges while working towards the completion of their documentary. Civil Rights leader W. Miller Barbour was one of the first African Americans to graduate from Elizabethtown College; first Executive Secretary for the National Urban League in Denver, Colorado; first Director of the National Urban League Western Field Office in Los Angeles, California. In the 1930s-1940s, Barbour identified the two most important needs of civil rights in the United States addressing discrimination in employment and housing. Barbour made a clear distinction between racial desegregation policy and the racial integration process. The students' short film provides biographical context for Barbour's life, a historical narrative of Barbour's civil rights social activism, and an analysis of Barbour's social justice legacy rooted in the tradition of Elizabethtown College.

Presenting Author(s): Mechelle Johnson-Reeves, Ava Barton **Elizabethtown College**
Additional Author(s): Prof. Jean-Paul Benowitz

O10-02: Defining the Experience of Diversity at Elizabethtown College

In an ongoing research project to uncover the history of people of colour, I continued the work I began in 2024 into the summer of 2025. Through the interviews I conducted this summer, my goal was to further broaden my horizon. And as my perspective expanded through the heart-to-heart conversations I had with alumni, so too did the college's understanding of the impact of these histories and lived experiences at Elizabethtown College. Through stories that provoked tears and moments of triumphant unity, each alum we spoke with reflected on their journey at Elizabethtown College. One thing, however, still remains the same: my opinion has not changed. One cannot label Elizabethtown College simply one way or the other. The institution as a whole is not simply racist, nor is it simply inclusive. It is complicated — but all complications can unravel into simple solutions, on the condition that the more one seeks to understand, the more clearly a solution can appear. These interviews serve to define Elizabethtown College's motto, educate for service. This type of education leads to knowledge that can help students in the community feel truly welcome — regardless of race, ethnicity, or creed — and, most importantly, never feel alone.

Presenting Author(s): Kalen Tendo **Elizabethtown College**
Additional Author(s): Ms. Rachel Grove Rohrbaugh

O11-01: How Do Academic Achievement and Creativity Predict Satisfaction and Meaning in Life?

What factors lead to a meaningful life with a sense of well-being? How is academic success related to success in life after graduation? Past research has shown that factors like academic achievement and creativity influence life satisfaction and meaning. Academic performance is linked to workplace success, and creativity may increase one's ability to navigate challenges and enhance one's sense of purpose. The present study predicted satisfaction and meaning in life using a variety of measures of creativity and academic performance. Two hundred thirty-three Elizabethtown College alumni (75% female, 93% white, age M = 33.60, SD = 6.79) from the undergraduate classes of 2012-2019 participated in an online survey about Purposeful Life Work. Questionnaires included measures of Life Satisfaction, Meaning in Life, the experience of autonomy, purpose, and creativity in and out of the workplace, and measures of creative self-efficacy. Results showed that Life Satisfaction was predicted by Creativity at Work (β = 0.28), Creativity Outside of Work (β = 0.21), and GPA (β = 0.16). When GPA, autonomy, purpose, and creativity at work and outside of work along with presence of and search for meaning in life were used to predict life satisfaction, Meaning in Life (β = 0.38), Work Autonomy (β = 0.29), and GPA (β = 0.12) were significant predictors of Life Satisfaction, whereas Purpose and Creativity at Work, and experiences outside of work were not unique predictors. Further analyses showed that Creativity at Work and Outside of Work related to Life Satisfaction through their positive influence on Meaning in Life (β = 0.27 and β = 0.22, respectively).These findings show that in addition to academic performance, other factors are significant in predicting life satisfaction, suggesting there are many aspects that should be evaluated when supporting the success of college students and those beyond graduation.

Presenting Author(s): Melany Bedoya **Elizabethtown College**
Additional Author(s): Dr. Jean Pretz

O11-02: Linking Environmental Policy to Alzheimer's Disease Burden: A Comparative State-Level and Patient-Level Analysis Using ADNI Data

This study investigates whether Alzheimer's disease (AD) severity among participants in the Alzheimer's Disease Neuroimaging Initiative (ADNI) aligns with national patterns of air pollution exposure—specifically fine particulate matter (PM2.5), a known carrier of polycyclic aromatic hydrocarbons (PAHs)—and differences in environmental policy strength across U.S. states. A composite severity score was created using cognitive and environmental burden indicators (MMSE, CDR, NTB, and RSEI). Individual-level data were linked to state-level estimates of PM2.5 and regulatory policy strength. States were evaluated using a five-tier rubric based on publicly available air quality regulations. Using PolicyMap visualizations, regression modeling, and analysis of covariance (ANCOVA), we assessed whether stronger environmental policy mitigates the impact of pollution on AD severity. Results will inform public health strategies and a corresponding policy brief to address environmental contributors to cognitive decline.

Presenting Author(s): Manali Misra, Snabu Neupane **Juniata College**
Additional Author(s): Dr. Tia Warrick

POSTER PRESENTATIONS

P1-01: "It's Gettin' Hot In Here": The Impact of Thermal Effluent on Atypical Rivers

Excess thermal effluent, or heated wastewater, causes an imbalance in river ecosystems. Understanding how this thermal waste affects particular streams is essential for effective environmental management. The Susquehanna River does not follow a typical stream structure defined by the Pennsylvania Department of Environmental Protections (DEP) due to its wide channel and shallow bed. To investigate the effect of varying thermal effluent temperatures on the unique ecosystem of the Susquehanna River, we plan to use stream channels available at Susquehanna University's Freshwater Research Institute (FRI) to replicate the river's structure. We also plan to use heated water to simulate thermal discharge and thermal gauges to monitor the temperature gradient across the channel as well as downstream. Preliminary work is underway, so trial data is not yet available. We expect that this analysis will provide valuable insights into the effect of thermal pollution on the ecosystems of atypical rivers like the Susquehanna River.

Presenting Author(s): Eric Belfanti **Susquehanna University**
Additional Author(s): Dr. Samya Bano Zain

P1-02: Assessing Tick-Borne Disease Risk: A Study of Tick Prevalence Throughout High-Traffic Trails in Huntingdon County

Given the forested nature of the Raystown Lake area and surrounding Huntingdon County regions, visitors who partake in the popular outdoor recreation activities have an increased risk of contracting tick-borne diseases (TBDs). TBDs pose a significant threat to public health. The extent of tick abundance and tick-borne pathogens within Huntingdon County must be determined to effectively educate and safeguard public health. Therefore, we collected tick specimens using the CDC's drag netting protocol for tick collection on ten heavily trafficked trails throughout Huntingdon County. In addition to tick population abundance, the terrain parameters, temperature, humidity, canopy cover, location, and time of day were recorded. The collected specimens were speciated, and the DNA of a subset was analyzed for a full panel of tick-borne pathogens. A further subgroup of pathogen-containing ticks will be subsequently sequenced, and the genomic data analyzed. Averaging data collected between 2023 to 2025, a majority (59.92%) of the collected ticks were found in leaf litter, with more than half (57.5%) of the ticks being in the larval life stage and of the Ixodes scapularis species (96.3%), which are the primary vector of Lyme disease. In addition, genomic analysis of the 2023 and 2024 tick specimens revealed that 20.8% tested positive for Borrelia species, 14.6% tested positive for Babesia species (the bacteria that cause babesiosis), and 3.6% tested positive for Anaplasma phagocytophilum (the bacterium that causes anaplasmosis). 19.8% tested positive for Borrelia burgdorferi. Additionally, 86 adult and nymph specimens collected from the public of Huntingdon County have been tested for B. burgdorferi, with 38.37% testing positive. By studying current and emerging tick-borne pathogens, we can identify trends in pathogen diversification and geographic expansion, which are crucial for effective disease management and prevention strategies to educate the public across the impacted county.

Presenting Author(s): Sarah Halteman, Juliana Onuskanich, Ashley Robuck, Lydia Seltzer
Additional Author(s): Dr. Jill Keeney, Dr. Regina Lamendella **Juniata College**

P1-03: Effects of vegetation structure on songbird nest success in wooded urban habitats differ from those observed in forest patches.

As urbanization expands, habitat fragmentation degrades environmental conditions that support wildlife, destabilizing ecosystems. Songbirds provide important ecosystem services, yet many native species suffer low nest success in urban habitats. While past studies focused on recording the effects of vegetation structure on nest success within urban forest patches, less is known about these effects in sparsely wooded urban habitats, like those on the Goucher College campus. In these more open environments, vegetation patches are often isolated and vary greatly in size, and edge conditions are ubiquitous. In this study, we monitored songbird nests and used LiDAR data to assess effects of vegetation structure on nest success in the campus habitats. Unlike previous studies in Baltimore forest patches, we found no significant correlations between overstory density and vegetation gaps and success. These results suggest the relationship between nesting outcomes and vegetation structure breaks down in wooded urban habitats outside of forest patches.

Presenting Author(s): Nahida Sultana Mim, Rawasi Aljamal **Goucher College**

P1-04: Evaluating baselines of seasonal phenologies and applications of the data in education and citizen science.

The alterations of climate change across the world are unprecedented in both the amount and rate of change. These changes are impacting biotic and abiotic factors of many ecosystems, and in response many species' ranges are shifting and their normal behaviors may be altered, ultimately impacting how species may interact. Insect life history traits (e.g., development, activity, reproduction) rely heavily on seasonality, being synchronized with fluctuations in light, temperature, moisture, and resource availability. Many insects withstand extreme seasonal fluctuations via diapause – a period of low metabolic activity and developmental arrest triggered by photoperiod and/or temperature - which is an important seasonal phenology, as its timing can influence other life history processes. The field cricket species, Gryllus pennsylvanicus and G. firmus, have ranges that span a large latitudinal and climatic gradient, and readily interact/interbreed in a hybrid zone along the edge of the Appalachian Mountains in the eastern U.S. Our project aims to identify emergence times of allopatric populations of our focal field cricket species using passive sound recording in natural populations. We will also bring this research into the classroom, allowing middle and high school students to have the opportunity to experience novel research and participate in citizen science. The topic will be introduced through an activity that teaches students about reproductive isolating barriers and the speciation process. Then the students will listen to our recordings from allopatric populations to identify when crickets emerge and are present, collecting novel data. Finally, there will be a follow-up meeting where the students' results will be analyzed and discussed, teaching students quantitative and figure generating skills.

Presenting Author(s): Addison Bert, Brayden Todd, Samantha Moyer **Juniata College**
Additional Author(s): Dr. Thomas J Firneno

P1-05: The Impact of Polyethylene Microplastics on Perfluoroalkyl Sulfonic Acids Adsorption in Soil

Perfluoroalkyl substances (PFAS) are a class of persistent, toxic pollutants widely detected in soil and water due to their resistance to degradation. Microplastics, also common in terrestrial environments, may influence PFAS transport by altering sorption dynamics. This study investigates how microplastic co-contamination affects the mobility of PFAS in soil systems. Adsorption isotherm experiments were conducted to evaluate PFAS sorption behavior in soil alone, soil with microplastics, and microplastics alone. Liquid Chromatography–Mass Spectrometry (LC-MS) was used to quantify PFAS concentrations. Sorption data were modeled using both Langmuir and Freundlich isotherm equations to evaluate fit, and results showed that PFOS sorption behavior most closely matched the Langmuir model, suggesting monolayer adsorption onto specific binding sites. Additionally, increasing the initial concentration of PFBS led to a greater average mass of PFBS adsorbed per unit mass of solid, indicating enhanced sorption at higher concentrations. These findings suggest that microplastics may influence PFAS behavior in soil by reducing sorption or acting as mobile carriers, with important implications for environmental mobility and risk assessment.

Presenting Author(s): Azhar Tanat **Goucher College**

P1-06: Impact of polyethylene microplastics on the adsorption capacities of perfluoroalkyl substances in soil using liquie chromatography - mass spectroscopy

Perfluoroalkyl substances (PFAS) are chemical pollutants that have become increasingly common throughout the environment, largely due to the contamination of soil and groundwater sources. Their extreme resistance to breaking down has given them the nickname "forever chemicals", and exposure to PFAS has been known to result in sickness or death for humans and many different animals. Microplastics are also ubiquitous in the environment, and their adsorption to PFAS has been found to alter the mobility of the chemical. The adsorption isotherms of three types of perfluoroalkyl carboxylic acids (PFCAs): perfluorobutanoic acid (PFBA), perfluorohexanoic acid (PFHxA), and perfluorooctanoic acid (PFOA) onto polyethylene microplastics (MPs), polyethylene microplastics and soil mixtures, and soil alone were analyzed with liquid chromatography - mass spectrometry (LC-MS). The Freundlich and Langmuir adsorption isotherm models were used to hypothesize how the presence of microplastics can alter the adsorption capacity of soil and impact the mobility of PFAS in soil environments. All three types of PFAS shaken with microplastics alone had a significantly higher adsorption isotherm than those shaken with microplastics + soil or soil alone, and the Langmuir model was a better fit for the PFBA and PFOA data while the Freundlich model was a better fit for the PFHxA data. Practical applications of this research can include the potential to reduce groundwater contamination with PFAS using microplastic and soil adsorption.

Presenting Author(s): Madison Spiers **Goucher College**
Additional Author(s):Dr. Rebekah Gray

P1-07: Improving solid phase extraction (SPE) recovery of perfluoroalkyl substances (PFAS) for detection in rainwater

Per- and polyfluoroalkyl substances (PFAS) are synthetic chemicals widely used in industrial and consumer products. Due to their resistance to degradation, they persist in the environment and can be transported through the atmosphere. One of the primary ways PFAS enter aquatic systems is through wet deposition, where atmospheric PFAS are carried by rainfall and contaminate surface and groundwater sources. This ongoing project aims to optimize a Solid Phase Extraction (SPE) protocol to recover trace levels of PFAS from rainwater samples for environmental monitoring. Initially, we used methanol as the eluent and included an evaporation step, but this led to poor PFAS recovery and potential sample loss. After modifying the method to use a 2% ammonium hydroxide in methanol solution and eliminating evaporation, preliminary results showed improved PFAS recovery and better reproducibility. So far, PFAS has been detected in all of the collected rainwater samples, with recovery rates varying depending on the chain length of the PFAS compounds. Short-chain PFAS were generally more prevalent. These results emphasize the widespread nature of PFAS contamination and the importance of developing reliable, low-loss methods for monitoring environmental exposure. By improving the extraction efficiency and detection reliability of PFAS in rainwater, this study contributes to better understanding the pathways through which these persistent pollutants spread and supports efforts to safeguard water quality.

Presenting Author(s): Mariam Abdelrady **Goucher College**
Additional Author(s): Dr. Rebekah Gray

P1-08: Investigating the Microbial Biotransformation of Per- and Polyfluoroalkyl Substances (PFAS) in AFFF-Contaminated Soils

Per- and polyfluoroalkyl substances (PFAS) are a group of man-made chemicals that are pervasive in the environment due to their widespread use in global chemical and manufacturing industries. Their environmental persistence has given them the name of "forever chemicals" and is one reason why they are widely studied, especially in regard to soil and water contamination, health effects, and bioaccumulation. In regard to Department of Defense (DoD) installations, PFAS prevalence in aqueous film-forming foam (AFFF) contaminated sites is of particular interest. While recent studies have found linkages between some microbial communities and PFAS biotransformation, this research is still relatively novel. This project, therefore, aims to investigate microbial communities that are active at various soil depths across 15 AFFF-impacted and corresponding un-impacted sites using 16S rRNA gene and metatranscriptomic (MT) analyses. This data will then be compared to the concentration of PFAS (obtained through chemical analyses) at each corresponding depth to determine how microbial communities at each depth affect PFAS transformation. Our preliminary MT analyses revealed enrichment of stress response and xenobiotic metabolism genes, including hydrolases and oxygenases, in PFAS-contaminated layers. Notably, taxa such as Nocardiaceae, Polyangiaceae, and Mycolicibacterium rhodesiae were more transcriptionally active in impacted soils,

suggesting functional adaptation to chemical stressors. We also found that PFAS concentration correlated with distinct gene expression patterns associated with membrane transport and oxidative stress mitigation. Several of these microbial functions may be relevant to PFAS tolerance or potential transformation. It is hypothesized that the microbes at various AFFF-impacted soil depths will be distinct from those in un-impacted sites. Information obtained through these comparisons will aid in evaluating PFAS exposure risk at each DoD site in addition to supporting remediation strategies for those sites.

Presenting Author(s): Rachael A. Filip **Juniata College**
Additional Author(s): Justin R. Wright, Dr. Charles E. Schaefer Jr., Dr. John F. Stults, Dr. Linda S. Lee, Dr. Youn Jeong Choi, and Dr. Regina Lamendella

P1-09: Unmasking Fungal Contributions to Clostridioides difficile Infection: Insights from Multi-Omics and Predictive Modeling

Clostridioides difficile infection (CDI) is a leading cause of nosocomial illness, marked by high recurrence and limited treatment options. While CDI has long been attributed solely to bacterial disruption, emerging research reveals that fungi, particularly opportunistic species like Nakaseomyces glabratus, may play a critical role in its pathogenesis and persistence. Using RT-qPCR, mouse models, and meta-omics sequencing, we have identified consistent fungal enrichment in CDI-positive patients, along with more severe disease in mice pre-colonized with Nakaseomyces glabratus. Functional analyses indicate that fungi contribute to microbial pathways involved in xenobiotic biosynthesis, biofilm formation, and lactate utilization, processes that may exacerbate CDI. To deepen our understanding of fungal contributions to CDI, we are performing matched metagenomic and metatranscriptomic analyses of over 500 human stool samples sourced from multiple clinical biorepositories. We are building NextFlow workflows to create a cohesive bioinformatics pipeline that performs taxonomic profiling with Kraken2 and functional pathway analysis with HUMAnN. Fungal gene expression will be interrogated using CoCo-GEMS to reveal active transcriptional signatures across the community. MaAsLin3 will be employed for differential abundance and multivariable association testing to identify fungal taxa and gene functions significantly linked to CDI status and severity. Predictive metabolic modeling will further elucidate potential microbe-microbe and host-microbe interactions, highlighting metabolic vulnerabilities within the gut ecosystem. In parallel, machine learning models will be developed to classify CDI cases and controls based on integrated taxonomic and functional features. This work aims to reveal previously unrecognized fungal drivers of CDI, providing a foundation for future therapeutic strategies, including the potential use of antifungal agents alongside standard CDI treatments.

Presenting Author(s): Manali Misra, Oscar Tuten **Juniata College**
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P1-10: Decomposition Rates of Common Saprotrophic Basidiomycotic Fungi in Central Appalachia

Decomposers are a vital part of every biological community across the globe. Each community requires a system that establishes nutrient flow and energy cycling that maintains the lives of organisms at each trophic level. Fungi are one of the most diverse, effective, widespread decomposers on Earth, and the stability and function of all environments are greatly dependent on their presence. Saprotrophic fungi are especially important in this process, as they live off of decaying matter, reducing this matter into forms available to other organisms. Despite their importance, very little comparative research has been done examining decomposition rates of different fungi, and how these decomposition rates change in relation to varying environmental factors. The objective of this research is to examine decomposition rates of saprotrophic basidiomycotic fungi native to central Appalachia in different conditions. To assess this, a range of fungi were collected in various wooded areas rich with decaying matter. The data collected thus far measured the growth rates of different mycelium in petri dishes, measured in diameter of the mycelium. Said data has been split into two categories: fungi with quickly growing, contamination-resistant mycelium, and fungi with slow growing or contamination-susceptible mycelium. In the former category are fungi in the genera Amanita, Aspidella, Lyophyllum, Agrocybe, Fomitopsis, Pycnoporellus, and Cerioporus. In the latter category are fungi in the genera Boletus, Agaricus, Russula, Notorynchus, Rhodotus, and Pluteus. The results of this study may provide some foundational insight into the ecological needs of these necessary decomposers, methods of restoration, and culturing of species of concern.

Presenting Author(s): Annie Ketterman **Juniata College**

P1-11: Shifts in Small Mammal Community Composition Following 50 years of Forest Succession at Raystown Lake

Succession refers to the gradual, predictable changes a habitat undergoes in structure, plant composition, and resource availability over time. These shifts can significantly influence wildlife communities by altering species' dominance and overall abundance. In 1973, the expansion of Raystown Lake in central Pennsylvania led to the abandonment of surrounding agricultural fields, allowing the decades-long process of natural succession to transform the landscape. Earlier that year, Juniata College researchers conducted a mark-recapture study to document the small mammal community prior to the lake's expansion. They identified a diverse species assemblage dominated by Peromyscus and Tamias. The study was later replicated in 1998, revealing a notable decline in species diversity as succession continued. In the summer of 2025, we re-established these sixteen historical trapping grids near Raystown Lake. Each grid consisted of twenty-five Sherman live traps, spaced six meters apart. We trapped for five consecutive nights, weather permitting. Captured individuals were identified to the species level, marked via fur shaving for later identification if recaptured, and released. Our preliminary results suggest that small mammal diversity was greatest in the 1970s, when the area was primarily agricultural. As succession progressed, species associated with human disturbance and open canopy declined, while forest-adapted species became increasingly more dominant. These findings highlight long-term community-level responses to habitat change driven by land use change.

Presenting Author(s): Kara Scotti **Juniata College**
Additional Author(s): Joseph Walsh, Eric Quallen

P1-12: Estimating the Size and Cost of a Geothermal System for Founders Residence Hall

This project investigates the feasibility and long-term benefits of transitioning the heating and cooling system of Founders Hall at Elizabethtown College to a geothermal HVAC system. The objective was to evaluate the building's current energy usage, determine the appropriate geothermal system sizing, and perform a detailed cost-benefit analysis, including Return on Investment (ROI) projections. Using foundational principles from building science and geothermal engineering, heating loads were estimated based on conditioned floor area (46,106 ft^2), building height, and standardized BTU/hour·ft^2 assumptions from Manual N guidelines. Both horizontal and vertical loop configurations were evaluated, accounting for system capacity requirements (approximately 106 tons), trench or borehole sizing, and installation costs. Capital expenditure estimates included equipment, drilling, piping, controls and integration ($50,000–$100,000), and retrofit costs ($2,000–$4,000 per ton). Calculations excluded contingency margins to provide a base-case scenario. Energy usage data from the college indicated annual HVAC electricity consumption between 660,000 and 880,000 kWh. Using current and projected electricity rates ($0.099 rising to $0.112 per kWh in 2026), the study compared current system costs to those of a geothermal system, projecting annual savings of approximately $60,000–$80,000. ROI analysis showed the investment would break even between 11 and 19 years depending on loop type, energy use level, and retrofit cost tier. This study is a critical step in Elizabethtown College's broader sustainability goals, aligning with carbon reduction efforts by transitioning from fossil fuel-based heating to renewable ground-source systems. The methods used—including thermal load modeling, pricing research, and life-cycle cost analysis—offer a scalable framework for similar institutional retrofits. The findings support geothermal as a viable, environmentally responsible, and economically justifiable solution for long-term infrastructure resilience and energy efficiency.

Presenting Author(s): Pedro Menezes de Castro Miranda **Elizabethtown College**
Additional Author(s):Dr. Brenda Read-Daily

P1-13: From Aisle to Apiary: Analyzing the Chemical Profiles of Store-Bought and Local Honey

Raw honey, produced by enzymatic conversion and dehydration of floral nectar by bees, retains more nutrients and trace minerals than processed honey. Mineral content varies with plant species, soil composition, and climate, and is typically higher in darker honeys. Minimal processing of raw honey preserves antioxidants and pollen, which may support immune tolerance to local allergens. In contrast, processed honey undergoes heating and filtration, reducing bioactive compounds and increasing levels of 5-hydroxymethylfurfural (HMF), a degradation product of fructose. HMF formation accelerates at higher temperatures and serves as a marker of honey quality and heat exposure. While HMF exhibits antioxidant and anti-inflammatory properties at low levels, excessive concentrations may be harmful This project compared various properties associated with raw, local honey, organic honey, and store-brand honey. Analysis included water content, pH, qualitative sugar composition, and mineral analysis using inductively

couple plasma – optical emission spectroscopy.

Presenting Author(s): Ella Powers **Elizabethtown College**

P1-14: Effects of Kinase Inhibitors on A549 Cell Viability & Protein Expression for Lung Cancer Treatment

Today, a large majority of cell lines used for cancer research are of European descent, while mortality rates in lung, breast, and prostate cancer remain significantly higher in African American populations. Current treatments include kinase inhibitors, which target proteins within the MAPK pathway to regulate cell proliferation, differentiation, and apoptosis. While these drugs are moving through clinical trials, there is limited research on effectiveness in African American populations, originating from a lack of available cell lines with different genetic backgrounds. Differences in gene expression and tumor growth could cause some clinical drugs to be less effective in different individuals and populations. This research project aims to characterize the effects of ERK inhibitors BVD-523 and VX-11e, as well as the AP-1 inhibitor Falcarindiol, currently in clinical trials, on non-small cell lung cancer in male and female cell lines of European and African American descent, beginning with the commonly studied cell line A549 (of white male origin). Each cell line is treated with varying amounts of each drug compound (1 µM – 100 µM) for varying durations (1 hour – 24 hours) to test cell viability, cell proliferation, and protein expression in different conditions. In future work, cell lines NCI-H23 (African American male), NCI-H2172 (white female), and NCI-H1385 (African American female) will also be characterized for comparison of drug effectiveness, hypothesized to demonstrate the need for individualized medical care based on genetic background.

Presenting Author(s): Samantha L. Small **Elizabethtown College**
Additional Author(s): Kellie Simon, Spencer Mefford

P1-15: Investigation of 2AP1 Protein Function and Optimal Conditions

Proteins are molecules which perform a variety of critical functions within an organism. A vast number of proteins exist with unique structures and purposes to support the organism in survival, although the complexity of proteins has resulted in difficulties with classification. Using x-ray crystallography, previous research has discovered the structure of a specific protein named 2AP1, however the function of the protein remains unconfirmed. Prior literature has hypothesized 2AP1 functions as a kinase, a type of enzyme which transfers phosphates onto other molecules. Here we verify that 2AP1 exhibits partial function as a kinase. We found through protein activity assays that 2AP1 demonstrates enzymatic activity when paired with a phosphatase substrate. Additionally, we discovered that basic environments at a constant temperature of 30°C resulted in increased activity, thus suggesting the optimal conditions for 2AP1. Our investigations involving glucosamine have also supported the theory that 2AP1 phosphorylates N-acetylglucosamine. Consequentially, these results indicate that 2AP1 may be involved in the amino sugar and nucleotide sugar metabolic pathway. The knowledge provided from this research allows for a more sophisticated understanding of biological pathways involving 2AP1 at the molecular level. Furthermore, a greater comprehension of 2AP1 function can deepen insights into disease mechanisms and provide new opportunities for drug discovery.

Presenting Author(s): Kellie Simon **Elizabethtown College**
Additional Author(s): Spencer Mefford, Samantha Small, Dr. Amy E. Defnet

P1-16: Exploring how atrazine exposure affects levels of matrix metalloproteinases in Danio rerio (zebrafish) embryos

Atrazine is a synthetic herbicide used on broadleaf weeds and grasses. Atrazine is absorbed from water by plants to properly work, leading to detectable and sometimes acute atrazine levels in agricultural runoff. Aquatic habitats and organisms may be impacted by exposure to these varying levels. Atrazine is a known endocrine disrupter, causing deformations like edemas and malformations in Xenopus laevis (African clawed frog) and Danio rerio (zebrafish). In this study, we aim to explore underlying explanations for these phenotypes by first focusing on enzymes that play critical roles in organ morphogenesis, matrix metalloproteinases (MMPs). D. rerio embryos were exposed to different concentrations of atrazine from 1 day post fertilization (dpf) to 5 dpf to determine if atrazine affects MMP expression in zebrafish embryos. We extracted total RNA, reverse transcribed the RNA, and performed RT-PCR to determine expression levels of MMPs in zebrafish at 5 dpf across five treatment groups. We will also examine neural development in fish expressing green fluorescent protein throughout their nervous system.

Presenting Author(s): Kourtney Douglas **Goucher College**
Additional Author(s): Daniela Harvey, Dr. Jenny Lenkowski

P1-17: Investigating the Effects of a Ubiquitous Mettl3 Knockdown in Drosophila melanogaster During Spermatogenesis

The gene that codes for the Mettl3 enzyme is highly conserved. This enzyme is responsible for m6A modification, which is a post-transcriptional modification that adds a methyl group to mRNA. We used the Gal4-UAS system to deplete Mettl3 in somatic and germline cells in Drosophila melanogaster testes; this was done to investigate the effects of Mettl3 loss during spermatogenesis. To understand the phenotypic effects this knockdown has on sperm development, testes were immunostained and visualized using confocal microscopy. The knockdown phenotypes, as observed through confocal microscopy, have characteristic swollen tips. The swollen tip phenotype is closely associated with muscle cell and hub mis-localization. We hypothesize that Mettl3 could be interacting with tsn, which may explain some observed phenotypes. The transcript of tsn has punitive Mettl3 binding sites and forms secondary structure required for Mettl3 binding. This work will potentially help to further understand the role of Mettl3 in Drosophila and provide insight into the role of m6A in reproduction and other biological processes that occur in metazoans.

Presenting Author(s): Layla Waldman **Susquehanna University**
Additional Author(s): Dr. Antonio Rockwell

P1-18: Investigating the role of TGFβ signaling in changes of the cytoskeleton during regeneration of the zebrafish (Danio rerio) retina

Zebrafish (Danio rerio) can completely regenerate their retinal neurons when they are damaged. Müller glial (MG) cells are activated after damage has occurred and act as tissue-specific stem cells. Mammalian MGs do not have this ability and instead exhibit reactive gliosis after retinal damage, leading to the formation of a glial scar and impaired vision. The TGFβ signaling pathway plays a key role in both processes, likely coming into play early in the damage response. Downregulation of TGFβ signaling after the initial response may allow regeneration to occur, while upregulation decreases or fully inhibits regeneration and causes a glial scar. This study aims to characterize expression and localization of cytoskeletal elements in the MG to determine if they are differently expressed when TGFβ signaling is manipulated. We performed a retinal photoreceptor lesion on adult zebrafish with truncated forms of key proteins that regulate or are regulated by the TGFβ pathway to further explore its role in regeneration. MG were visualized with fluorescence microscopy to determine the differences in the regenerative ability of zebrafish with those truncated genes as compared to non-mutant fish.

Presenting Author(s): Katherine West **Goucher College**
Additional Author(s): Sare King

P1-19: Sleepy Flies and Sticky Proteins: Tracking Parkinson's Like Symptoms in GBA-Deficient Drosophila

Parkinson's disease (PD) is the second most prevalent neurodegenerative disorder, characterized by movement difficulties, tremors, and balance issues. There are several different mechanisms of cause for PD. The most common genetic risk is a mutation in the gene responsible for producing glucocerebrosidase (GBA). Drosophila Molanagster (fruit flies) with a deficiency in GBA demonstrate symptoms resembling Parkinson's, such as changes in sleep patterns, protein aggregation, shortened lifespan, and reduced climbing ability. Looking at protein aggregation can be a key indication of disease progression with fruit flies. Typically, we measure protein aggregation of the flies on day 10 comparing the control and GBA deletion flies. This project aims to investigate the progression of protein aggregation and sleep disturbances within the early life cycle of the GBA deficient fruit fly. To do this we compared 2 different genotypes across 4 different time points: Deletion and control flies aged to and frozen at day 3, day 6, day 8, and day 10. It is anticipated protein aggregation will accumulate with time. To monitor their sleep we will monitor their sleep patterns using the Drosophila Activity Monitoring System. Both deletion and control flies were monitored in a range from Day 1 to day 10. We expect the deletion of flies' sleep to get worse as the progression of neurodegeneration does. Additionally, we wanted to investigate how muscle-specific expression of GBA influences sleep quality and overall protein aggregation. We compared four groups of flies: those lacking the GBA gene, those with the natural GBA gene, those missing the GBA gene but with

ectopic expression in muscle cells using the GAL4/UAS system, and those with both the natural GBA gene and ectopic muscle cell expression.

Presenting Author(s): Regan L. Farringer **Juniata College**
Additional Author(s): Dr. Kathryn A. Jewett

P1-20: The Effects of Heavy Metal Stress on Transgenerational Inheritance in Drosophila melanogaster

Everyone is familiar with the idea of differences in observable traits caused by variations in DNA sequences that are heritable. However, some differences can be passed down, but they aren't caused by variations in DNA sequences. This phenomenon is called epigenetics. To add on, "transgenerational inheritance" is the phenomenon of altered phenotypes being passed down to subsequent generations, even if the progeny didn't experience the same exposures as the parents. This experiment focuses on investigating epigenetic transgenerational inheritance in the model Drosophila melanogaster (fruit flies) by inducing heavy metal stress. Two different wild-type lines and three different seizure-prone lines (tko, jus, bas) were examined for several phenotypic changes. The G0 generation was cultured in food containing one of three heavy metals: cadmium, copper, or hexavalent chromium. These flies were then crossed with wild-type non-treated flies on normal food. The following generations were similarly crossed with wild-type non-treated flies on normal food. Exposure to each of the three heavy metals resulted in wing defects in the G0 generation: a majority of flies had wings that were curled, wrinkled, incomplete, and/or notched. Additionally, the wing veins appeared softened, broken, fused, and/or missing. Both wild-type lines showed significant changes to the wings, but notably, the seizure lines exhibited little to no defects in the G0. Despite no exposure to heavy metals in their food, subsequent generations still showed wing defects. Ultimately, these data confirm transgenerational inheritance in wing morphology caused by heavy metals in wild-type D. melanogaster. We still do not understand why the wing effects are weaker in seizure-prone lines, and we are continuing to investigate. We also intend to look into the effects of metal exposure on seizures.

Presenting Author(s): Earianne Evangelista **Moravian University**

P1-21: Determining the Function of YPR015C in Saccharomyces cerevisiae

The yeast genome is made up of ~6000 open reading frames, and of these, ~1300 are uncharacterized Genes of Unknown Function (GUF). YPR015C, a possible zinc finger-containing transcription factor, is one GUF of interest. When YPR015C is over expressed it has been shown to cause cell cycle defects. Studies have also shown that YPR015C delete mutants have significantly altered gene expression, indicating a role in transcription. To investigate the function of YPR015C in Saccharomyces cerevisiae, bioinformatic analysis was performed with Protein Analysis Through Evolutionary Relationships (PANTHER). These data suggest that YPR015C was likely involved in transcription and with RNA polymerase II. The InterPro database, using sequence matching, matched YPR015C with the C2H2 zinc finger domain, again suggesting YPR015C likely functions as a transcription factor. Another bioinformatic tool, Genemania, suggested connections between YPR015C and multiple zinc finger related proteins through both genetic relations and co-expression. We used PCR-mediated gene disruption to replace YPR015C with the LEU2 auxotrophic marker in two distinct genetic backgrounds. In order to address if YPR015C plays a role in cell cycle progression, we performed a budding index assay. Our data suggests that deletion of YPR015C leads to defects in cell cycle progression. Finally, we used a spotting assay to determine novel functions of YPR015C. Our preliminary data suggest that deletion of YPR015C in the BY4741 background causes defects in DNA damage response. It is of note that both the bud index and spotting assays were performed with an unverified deletion strain.

Presenting Author(s): Ross Mahler **Susquehanna University**
Additional Author(s): Gabriella Wagner

P1-022: The Biological Function of YPR013C (CMR3) in the Yeast Saccharomyces cerevisiae

Of the ~6,000 open reading frames in the Saccharomyces cerevisiae genome, approximately 1,300 remain uncharacterized and are classified as Genes of Unknown Function (GUFs). One such gene of interest is YPR013C. Bioinformatic analyses via PANTHER gene ontology and Yeast Genome suggests that YPR013C encodes a putative zinc finger transcription factor featuring a tandem zinc finger array. Predicted functions include roles in DNA binding, transcriptional regulation, metabolism, and cellular responses to stress, toxins, and immune-related signals. Additional bioinformatic research associates YPR013C with

phenotypes such as haploinsufficiency, G1 phase cell cycle progression, metal ion resistance, and reduced lifespan—traits commonly shared among genes with similar regulatory functions. To investigate these potential roles, we conducted yeast transformations, spotting assays, and a budding index to assess the gene's contribution to stress tolerance and other cellular processes.

Presenting Author(s): Gabrielle Wagner, **Susquehanna University**
Additional Author(s): Dr. Michael Parra

P1-23: GLP-1 Effects on Gut Microbiome

The goal of this study is to measure the gut microbiome communities of individuals before and after taking Ozempic. This study will provide an understanding of how Ozempic affects the gut, body weight and the microbial community. This longitudinal study will investigate the long-term use of GLP-1 agonists as it affects the microbial community, diversity and function. The fecal specimens will be collected from 25 human individuals at four time points (Baseline (Before Ozempic), and 1, 3, and 6 months after Ozempic). Fecal specimens will be sent to our laboratory for DNA extraction, 16S rRNA gene PCR and sequencing. After bioinformatics analysis we will compare the bacterial community changes before and after Ozempic administration.

Presenting Author(s): Omkar Warke, Stephen Kataria and Tamir Tadesse **Juniata College**
Additional Author(s): Dr. Regina Lamendella

P1-24: The Wonderfully Understudied World of Protein: Understanding 3PU9

The Biochemistry Authentic Scientific Inquiry Laboratory (BASIL) project aims to categorize the characteristics of proteins with known sequences and crystal structures but unknown functions. The goal of this project is to characterize one of these proteins, 3PU9, to understand the role it plays in its original host species and the conditions it operates under. We hypothesized that 3PU9 was an enzyme in the kinase or hydrolase family and performed various assays to determine its function. Para-Nitrophenyl Phosphate (pNPP) and para-Nitrophenyl Acetate (pNPA) were used as indicators to determine whether the protein in question is a hydrolase, being able to cleave phosphate or acetate, respectively. The reactions were conducted under various conditions including adjusting pH to be more basic in the range of 7-9 and increasing incubation temperature as the reaction is taking place at an upward temperature of 37°C. The most optimal conditions found thus far are to conduct the assays at a pH of 9 at 30°C. Due to the protein reacting with both pNPP and pNPA under various conditions, it is believed that the protein is a hydrolase. However further testing is needed to rule out all other options.

Presenting Author(s): Spencer Mefford **Elizabethtown College**
Additional Author(s): Dr. Amy E. Defnet

P1-25: Incorporation of Luminescent Transition Metal Complexes into Metal-Organic Frameworks for Ion Sensing Applications

Metal-Organic Frameworks (MOFs) are a system of metal centers that coordinate with organic ligands to form extended porous structures. MOFs have been of interest due to the host of properties they possess like high stability, crystallinity, surface area, and the flexibility to be modified. These properties can lead to numerous applications, such as small molecule and ion detection. When a small amount of luminescent transition metal complex is added to a zirconium-based MOF the solid-state material retains the photophysical properties of the transition metal complex. This project explored different polypyridyl transition metal complexes that included zirconium, rhenium, and osmium to study luminescence stemming from ligand-to-metal-charge transfer (Zr) and metal-to-ligand-charge transfer (Re, Os). Reported here are new synthetic strategies for making complexes using microwave synthesis and characterization based on infrared and NMR spectroscopy. Photophysical characterization of the complexes in solution and in modified MOF are detailed.

Presenting Author(s): Robert Lynch, Matthew Lamb **Elizabethtown College**

P2-01: Can't teach an old rat a new trick: Do aged male rats learn extinction in a passive avoidance paradigm?

Extinction is a procedure where cues that have been previously paired with a biologically relevant reinforcer are presented without the outcome. This unreinforced cue exposure causes a reduction in

the learned response. Although there is a reduction in response, it is now accepted that extinction does not involve unlearning, but rather new learning (Bouton, 2004). Extinction is widely studied in rodents because it is the basis of exposure-based treatment of anxiety disorders in humans. Although extinction is somewhat effective at reducing experimentally induced fear, aged rats have been shown to be resistant to extinction learning (Robinson et al., 2024). Thus, our aim was to investigate whether old male rats could learn extinction using an avoidance task. Preliminary results show that older male rats failed to demonstrate extinction learning, suggesting that age impairs this competing learning. These results imply that aged male rats process this new learning differently, which could have clinical implications.

Presenting Author(s): Madison L. Spencer **Susquehanna University**
Additional Author(s): Dr. James F. Briggs

P2-02: Linking Brain Structure to Age-Related Differences in Spoken Word Processing

The natural aging process in humans is associated with many different aspects of auditory processing decline, which involves changes in neural activity and structure. One of the first studies to examine age-related differences in auditory cortex activity during spoken word recognition was Rogers et al. (2020). This study focused primarily on functional neuroimaging, leaving a gap in the understanding of the structural brain changes during these behavioral tasks. This current study is one of the first to examine brain structure and verbal recognition in older adults versus younger adults, as well as examine whether structural brain measures in auditory cortex regions correlate with age-related differences in an auditory language recognition task. This study utilized structural MRI (sMRI) data from an open-source dataset (Rogers et al., 2020) that included 29 young adults (ages 19-30) and 32 older adults (ages 65-81). FreeSurfer was used to extract gray matter microstructure measures, such as cortical thickness, from various auditory cortex regions, such as the inferior frontal gyrus and anterior cingulate cortex, and behavioral data was examined and ran through statistical analyses using Jamovi. This study found that age was a significant predictor of accuracy, with the accuracy tending to decrease as age increased. In older adults, there was a positive correlation between increased accuracy and increased thickness in the left inferior frontal gyrus pars triangularis, indicating older adults may rely on this region. By contrast, increased thickness in the bilateral anterior cingulate gyrus (ACC) was negatively correlated with accuracy for all patients, highlighting its role in error monitoring (Zendehrouh et al., 2013). These findings provide new insights into age-related auditory processing differences and indicate that both older and younger adults are likely to utilize distinct brain regions for spoken word processing. With this information, potential biomarkers and interventions for age-related cognitive decline can be discovered and implemented.

Presenting Author(s): Makenna Snyder **Elizabethtown College**
Additional Author(s): Dr. Jennifer Wittmeyer

P2-03: Structural Brain Correlates of Intrusive Memories Following Exposure to Distressing Events

Intrusive memories are a core symptom of post-traumatic stress disorder (PTSD) and reflect disruptions in emotional memory and regulation. This study investigated gray matter correlates of intrusive thoughts following exposure to distressing visual stimuli. Using previously collected data (Visser et al., 2021), participants viewed a series of 60-second aversive video clips during MRI scanning, completed self-report measures including the DASS-21 (Depression, Anxiety, and Stress Scale) (Lovibond & Lovibond, 1995), and sleep quality questionnaires, and tracked the frequency of intrusive thoughts through post-scan journaling. Analyses revealed that anxiety symptoms were positively correlated with gray matter volume in the left amygdala and hippocampus, consistent with their roles in anxiogenesis and emotional memory encoding (Picci et al., 2022). Conversely, greater cortical thickness in the bilateral anterior cingulate cortex (ACC) was associated with reduced anxiety and fewer intrusive thoughts, suggesting a neuroprotective role (Frodl et al., 2008). Sleep quality also positively correlated with gray matter volume in the right hippocampus. These findings suggest that structural variation in emotion- and memory-related brain regions may shape vulnerability to intrusive memories. Understanding these neural markers may inform targeted interventions for individuals at risk of PTSD, with implications for prevention and treatment strategies.

Presenting Author(s): Chloe Haldeman **Elizabethtown College**
Additional Author(s): Dr. Jennifer Wittmeyer

P2-04: The Best Handwriting Method to Avoid Cramping and Arthritis

Handwriting is one of the most basic skills humans use to communicate ideas effectively. However, due to recent rises of technology usage within schools, less focus has been placed on proper penmanship. This had led entire generations to have a small amount of knowledge about writing in general, but also allowed many different and unique writing methods to emerge. There are four basic grips that most handwriting grips can be grouped into: Dynamic Tripod, Dynamic Quadrupod, Lateral Tripod, and Lateral Quadrupod. Several methods have been tested and tried, leaving only three: OpenSim, Arduino Sensors, and EMG values. Using both Kinovea, EMG values and grip strength values, a hand model can be used to examine the stresses on different muscles to determine effectiveness of a grip with the help of OpenSim. Small sensors are placed on a writing instrument to measure the strength of a grip in 25 Newton increments. Using electrode sensors, the electrical pulses of the muscles can be measured during the process of writing [4]. Which leaves the main question to be asked, if there is a "best" grip to use, then why? If there is not, then why does the grip not matter? At the current point in time, it is unclear if there is truly one grip above them all. However, the ramifications of one existing or not existing is what future studies will be based on.

Presenting Author(s): Arden Kiner **Elizabethtown College**

P2-05: The Buyer's Remorse in Green Choices: A Cross-Cultural Analysis of Cognitive Dissonance in Sustainable Fashion (U.S. vs. China)

The rapidly expanding global sustainable fashion market is bothered by the high rate of returns, highlighting a persistent gap between pro-sustainability attitudes and actual consumer behavior. In this study, we look at post-purchase cognitive dissonance, also known as buyer's remorse, as a major driver for this behavior, especially when it comes to returning eco-friendly fashion items. While cognitive dissonance is well-studied, its cross-cultural dimensions in sustainable consumption remain underexplored. Thus, we aim to analyze how cultural differences between U.S. and Chinese consumers influence the experience and response to dissonance after purchasing a sustainable fashion item. With a mixed-methods design, this study includes both quantitative and qualitative pieces. The quantitative online survey is based on the 22-item multidimensional dissonance scale (Sweeney et al., 2000) to measure the psychological discomfort and regret immediately after purchase. Demographic and cultural perspective questions are included to examine how culture, income, and education levels might impact or moderate behavioral responses like returns or complaints. Then, the qualitative interviews will be conducted to explore the nuances behind the observed patterns. In Hofstede's model of cultural dimensions, there are strong contrasts between U.S. and China. The U.S. scores exceptionally high on Individualism, suggesting that American consumers are more likely to experience psychological discomfort when a purchase conflicts with their personal attitudes and self-concept. Conversely, China's high score on Long-Term Orientation suggests a cultural pragmatism where consumers may be more willing to think about the long-term virtue of sustainability, potentially mitigating dissonance. It is thus hypothesized that U.S. consumers will experience higher levels of post-purchase dissonance and will be more inclined to take external action to resolve it, while Chinese consumers' responses will show lower levels of dissonance and be less likely to engage in external resolution behaviors.

Presenting Author(s): Yuanyuan (Abby) Sunchen, **Juniata College**
Additional Author(s): Dr. Li Shen

P2-06: Developmental Staging of G. pennsylvanicus and G. firmus

The speciation process is driven by numerous barriers to reproduction, either working individually or compounded. Temporal isolation is a reproductive isolating barrier created through differences in timing between two species or within species that prevents interaction and interbreeding. In insects, initiation and termination of developmental and reproductive periods are dependent on seasonal cues. When those cues shift due to anthropogenic climate change, different species can respond in different ways, creating phenological mismatches. These differences in expressed phenotypes cause differences in life cycle timing, creating temporal isolation between the species. One such period is diapause - a period of embryonic developmental arrest characterized by a hibernation-like state wherein metabolic activity and further development is suspended. Changing cues can lead to changes in initiation and termination of diapause, which impacts the entire life cycle of the insect and dictates how their interactions with other species will occur. The North American field cricket species - Gryllus pennsylvanicus and G. firmus - interbreed along a latitudinally extensive hybrid zone that runs along the Appalachian mountains. While both species are believed to undergo diapause across their entire range and have one generation per year, G. firmus is

believed to emerge later in the growing season or bypass diapause altogether in the southern portion of their range. This could lead to asynchronous emergence times between the species causing stronger temporal barriers to reproduction in the southern hybrid zone. To explore the underlying developmental mechanisms of diapause in these species, we created and are creating protocols to track and stage developmental timing, as well as characterizing the initiation/termination of diapause. The development of these species, as well as any diapausing field cricket, has never been comprehensively studied. Furthermore, this will add to a growing breadth of knowledge of how temporal isolating mechanisms affect hybridization and speciation as a whole.

Presenting Author(s): Bella Rose, Dr. Randy Bennett, & Dr. Thomas J. Firneno Juniata College

P2-07: Ecological and Evolutionary Implications of Mobbing as an Anti-Predator Behavior

Mobbing is an anti-predator behavior where animals actively approach and harass predators, rather than avoiding them. While commonly observed in birds, mobbing has rarely been documented in marine invertebrates. Grass shrimp (Palaemon pugio and Palaemon vulgaris) provide a unique opportunity to study this behavior in a new context. Shrimp from four sites were collected and tested in laboratory experiments designed to measure both their interactions with crab predators and their social behaviors with each other to determine whether mobbing in grass shrimp is linked to dominance and if it varies depending on location. Video footage was analyzed to quantify mobbing events and dominance interactions. Preliminary results show that both species mob and form dominance hierarchies, though the frequency can vary by location.

Presenting Author(s): Jesus Campos Moravian University
Additional Author(s): Dr. Joshua Lord

P2-08: Finding out the mechanism behind mobbing

The complex anti predator behavior such as mobbing is not studied in invertebrates. The invertebrates we are using in this study are grass shrimp (palemon pugio). Mobbing in this context is when prey attack their predator. We study mobbing between grass shrimp and their natural predator, the blue crab. We do not know exactly why the grass shrimp mob, so we decided to implement the SSRI Fluoxetine (prozac) into our study by dosing the shrimp with said SSRI. We chose the SSRI fluoxetine because we know it lowers aggression thus leading us to believe that it will slow down or even eliminate the antipredator of mobbing in our study organism. Video analysis has shown us that the shrimp had slower movement, less frequent fights and more importantly, less mobbing.

Presenting Author(s): Jillian Barrows Moravian University

P2-09: Plasticity of Diapause in Hybridizing Field Crickets

The alterations of climate change across the world are unprecedented in both the amount and rate of change. These changes are impacting biotic and abiotic factors of many ecosystems, and in response many species' ranges are shifting, and their normal behaviors may be altered, ultimately impacting how species may interact. Insect life history traits (e.g., development, activity, reproduction) rely heavily on seasonality, being synchronized with fluctuations in light, temperature, moisture, and resource availability. Many insects withstand extreme seasonal fluctuations via diapause – a period of low metabolic activity and developmental arrest triggered by photoperiod and/or temperature - which is an important seasonal phenology, as its timing can influence other life history processes. The field cricket species, Gryllus pennsylvanicus and G. firmus, have ranges that span a large latitudinal and climatic gradient, and readily interact/interbreed in a hybrid zone along the edge of the Appalachian Mountains in the eastern U.S. Using these species, we characterized the plasticity of diapause and development between species and populations. We used common garden experiments in which we overwintered eggs from four populations of both species for different lengths of time and then quantified how long it took for them to hatch and develop after ending overwintering. These experiments have given us a baseline of diapause and development to be able to study and characterize these life history traits and their plasticity in response to a changing climate across the entire latitudinal range of these species. Furthermore, these data can be used to study how these processes impact species interactions and hybridization dynamics in these species.

Presenting Author(s): Kenneth Sorokie, Juniata College
Additional Author(s): Lauren Mahkovic, Rilee Connors, Dominique Amisial, Dr. Thomas J Firneno Jr.

P2-10: Impact of academic and non-academic factors on student success and retention rates
Using various datasets pulled from Juniata College's systems, this research is an ongoing project of the Office of Institutional Effectiveness & Research to better comprehend and enhance students' success and retention. Understanding the key indicators leading to students' decisions to transfer, withdraw, or graduate on time is essential for strengthening institutional support and improving overall student outcomes. We have applied quantitative and qualitative methods through technical tools, including R Studio, Python, Tableau, etc., to analyze different surveys and students' data. Our analysis used institutional data from 2016 to 2024 to look at indicators such as enrollment trends, academic records, demographic characteristics, financial aid status, high-impact practices (HIP), summer/ winter courses, and student attrition trends. So far, the findings have shown that academic divisions and home regions are two key indicators influencing students' decisions to drop out. Moreover, data visualization made from different surveys can help the college create meaningful activities to increase students' sense of belonging, connect them with on-campus resources, and assist them in long-term success. We also developed predictive models through R Studio to evaluate withdrawal risk scores and important factors affecting drop-out rates from pre-enrollment data. As a result, the institution can implement effective strategies to approach a certain group of students who have high risk scores of leaving. This work supports Juniata College's ongoing commitment to better student experience and students' success through data-informed decision-making and targeted academic support initiatives.

Presenting Author(s): Bhuvi Ajmera, Jahnavi Patel, Ngoc Anh Khong **Juniata College**

P2-11: Wings Up: Researching and Writing A History of Juniata College, 2001-2026
As Juniata College approaches its sesquicentennial in 2026, it is essential to reflect on the events that have impacted the college and wider community over the past 25 years. The anniversary also necessitates renewed efforts to preserve records of these changes and events. Continuing a tradition from past anniversaries, a commemorative book will document important developments and their impact on students, alumni, and the community, serving as a lasting legacy of Juniata's evolving history.

The book will be organized thematically, rather than chronologically. This will create an engaging and focused examination of recent events. Specific Juniata events and features will be detailed in dedicated sections.

We began by conducting a systematic readthrough of Juniata Magazine and The Juniatian, the college's magazine and student newspaper, respectively. Both sources provided insight into Juniata's student body, administration, renovations, and campus culture.

We will continue gathering sources from the Juniata College archives and materials preserved by faculty, staff, and alumni. For example, we will access the college's digital photo archive and use images from the college's former yearbook, The Alfarata, to illustrate the past 25 years.
Next, we outlined a list of individuals with notable contributions and long tenures at Juniata College to conduct oral interviews with. Prompts are created and tailored to each subject before the interviews. Accessing IPEDS data allowed us to create visual representations of Juniata's enrollment statistics, including racial, economic, and educational data, which will be used to compare changes in the college community over the past quarter century.

Other significant events such as the college's reaction to 9/11 and COVID-19 will be documented in this book, as well as milestones like the Juniata Women's Volleyball championship victories, renovations, sports teams, POEs, and the evolution of student life.

Presenting Author(s): Madison Seipp, Finn Thornhill **Juniata College**

P2-12: Many Numbers: A multi-site exploration of early childhood numeracy
Many Numbers is a worldwide research collaborative including over 140 participating sites in 28 countries. The data collected will provide a strong foundation for understanding early numeracy in children, and it will help researchers to understand how various languages and cultures can affect a child's cognitive development. Four tasks will be completed by each participant (2-5 years old). During the Give-N task, children will be asked to provide N number of rubber ducks. The Highest Count task involves children counting as high as they can without making an error. In the Dot-Comparison task, children will be shown two sets of dots side by side on a screen, and asked to indicate which set has more dots. In the Visual Memory task, children will be shown images of universally recognizable objects and must pick them out

from a lineup on the following screen after a brief delay. The number of images they are shown increases gradually as the task goes on. The possible correlations between performance on the different tasks and demographic characteristics (e.g., parental education, family income, external childcare) will be examined. Many prior studies aimed at testing this correlation have focused on Westernized cultures and therefore the results cannot be generalized. Early child number knowledge is linked to increased problem-solving skills, cognitive development, and math achievement in schools. With increased understanding of numeracy in children, early number learning can be optimized to produce the best results in later education. This study will also provide footwork for more in-depth research to be done on the subject, helping to organize research on a topic that was previously unsystematic.

Presenting Author(s): Luke Ryan, Katherine Gruver **Susquehanna University**
Additional Author(s): Jennifer Asmuth Ph.D.

P2-13: Creating Meaningful Community Engagement at the Juniata College Museum of Art

The Juniata College Museum of Art (JCMA) is a small art museum in Huntingdon, Pennsylvania, with a diverse collection of over 1,200 works. It serves three primary audiences—campus (including staff and students), locals, and tourists—with the following mission:

"The JCMA contributes to the social and intellectual well-being of its campus and local communities by providing access to works of distinctive aesthetic quality in ways that inspire, provoke creative and critical thought, and refresh the spirit."

In alignment with our mission, we seek to increase our impact upon the local community audience in particular. This study combines museum theory and audience research to design new strategies that meaningfully connect with our community. Driven by goals of consistency, sustainability, and relevance, these strategies include: (1) formalize community partnerships, (2) create a social media plan, and (3) establish greater use of the JCMA Digital App. Goals of consistency, sustainability, and relevance will drive the process. The outcome will be the creation of an interpretative plan for the JCMA, a living document that will guide engagement efforts for the 2025-26 academic year.

Presenting Author(s): Andi Bradsher **Juniata College**

P2-14: Model-Pool Driven Dataset Distillation for Architecture-Agnostic Generalization

Dataset distillation synthesizes compact datasets for efficient model training, but existing methods often overfit to the architecture used during distillation, limiting transferability. We propose a model-pool driven dataset distillation framework to achieve architecture-agnostic generalization. By combining gradient matching with random sampling from a diverse model pool during distillation, and integrating knowledge distillation with a fixed teacher, our method enables the synthetic dataset to generalize across architectures. Experiments on CIFAR-10 with 10 images per class demonstrate that our approach significantly improves performance across diverse models, including MLP, LeNet, AlexNet, VGG11, and ResNet18, outperforming single-architecture baselines. Our results show that distilled datasets can achieve robust, cross-architecture generalization, making dataset distillation practical for efficient and versatile deep learning.

Presenting Author(s): Venus Yan **Juniata College**

P2-15: Characterization of Native American Pottery Sherds from the Isle of Que - Selinsgrove, PA Part 1

Analysis of pottery and stoneware collected from the Isle of Que, Selinsgrove, PA, indicates interaction and the exchange of goods among native groups. Pottery samples, found through a survey of plowed fields, represent a transition between Archaic and Woodland ages (4,300 to 300 yrs BP). Among the 593 pieces of pottery donated to the university, fragments of steatite and metarhyolite were found. These kinds of rock have a provenance located nearly 140 km downstream in Lancaster and South Mountain, PA. This study is examining the physical, chemical, and mineralogical composition of the pottery to determine if it also has a distant source. Some samples have been made into thin sections for examination, and some samples have been made into pressed pellets for geochemical analysis using X-ray fluorescence (WDXRF). The pottery ranges in thickness from 0.2 mm to 1.13 mm and is between 5.6 cm^2 and 22.6 cm^2 in size. These gravel-sized artifacts display designs consisting of square stylus, circular punctuation, cord marked and/or fabric draped, and sand pressed. Not all pottery has obvious patterns. Its color is mostly

shades of brown, gray, and reddish orange. The pottery sherds contain sand-size mineralized temper and pores. Temper material includes mono- and polycrystalline quartz, quartzite, sandstone, grog, chert, and organic material. The porosity in the sherds alludes to the utilization of coil-based construction (air trapped between coils), shell fragments, or organic matter. The firing of some pottery containing iron-rich clots increased its magnetic susceptibility. The Isle of Que is located downstream from the confluence of the West and North branches of the Susquehanna River, where many native trails and cultures intersect. With continued examination and analysis, the natural resources used to make pottery and cultural exchanges may be better understood.

Presenting Author(s): Ainslee M. Binkley and EmmaLia Ciccarello **Susquehanna University**
Additional Author(s): Dr. Jennifer M. Elick

P3-16: Characterization of Native American Pottery Sherds from the Isle of Que - Selinsgrove, PA Part 2

Analysis of pottery and stoneware collected from the Isle of Que, Selinsgrove, PA, indicates interaction and the exchange of goods among native groups. Pottery samples, found through a survey of plowed fields, represent a transition between Archaic and Woodland ages (4,300 to 300 yrs BP). Among the 593 pieces of pottery donated to the university, fragments of steatite and metarhyolite were found. These kinds of rock have a provenance located nearly 140 km downstream in Lancaster and South Mountain, PA. This study is examining the physical, chemical, and mineralogical composition of the pottery to determine if it also has a distant source. Some samples have been made into thin sections for examination, and some samples have been made into pressed pellets for geochemical analysis using X-ray fluorescence (WDXRF). The pottery ranges in thickness from 0.2 mm to 1.13 mm and is between 5.6 cm^2 and 22.6 cm^2 in size. These gravel-sized artifacts display designs consisting of square stylus, circular punctuation, cord marked and/or fabric draped, and sand pressed. Not all pottery has obvious patterns. Its color is mostly shades of brown, gray, and reddish orange. The pottery sherds contain sand-size mineralized temper and pores. Temper material includes mono- and polycrystalline quartz, quartzite, sandstone, grog, chert, and organic material. The porosity in the sherds alludes to the utilization of coil-based construction (air trapped between coils), shell fragments, or organic matter. The firing of some pottery containing iron-rich clots increased its magnetic susceptibility. The Isle of Que is located downstream from the confluence of the West and North branches of the Susquehanna River, where many native trails and cultures intersect. With continued examination and analysis, the natural resources used to make pottery and cultural exchanges may be better understood.

Presenting Author(s): Ainslee M. Binkley and EmmaLia Ciccarello **Susquehanna University**
Additional Author(s): Dr. Jennifer M. Elick

P2-17: Marketing Across Borders: Reimagining Advertising in the U.S. and India

Both the American and Indian marketing sectors are growing significantly. The U.S. advertising sector in 2024 was valued at $172.4 billion, whereas that of India was valued at ₹908.6 billion ($10.8 billion) and is forecasted to sustain steady growth in the coming decade. In America, companies are coming together to consolidate data-driven capabilities, while Indian marketers are experimenting with techniques like brain mapping to appeal emotionally to customers. But despite the quicker growth of both economies, American and Indian advertising alike remains heavily culture-driven. American advertising is efficiency-, segment-, and innovation-oriented, reflecting a low-context, individualist culture that emphasizes directness and technological precision. Indian advertising, conversely, is emotion-, tradition-, and storytelling-driven, reacting to a high-context, collectivist culture in which symbolism and group values convey more depth. Hofstede's cultural dimensions theory gives a good tool for this; the U.S. is individualistic-high and power distance-low, which means it likes ad copy constructed around self-expression and directness. India is power distance-high and collectivist, and hence it likes messaging about family, respect, and commonality. This raises a very serious question. How do cultural differences influence the effectiveness of marketing strategies and advertisements in India and the United States, and what key elements contribute to consumer recall and engagement across these two markets? Therefore, my research explores how culture impacts both the creation and reception of ads. Using surveys of over 500 consumers and marketers, I'm analyzing what truly captures attention and leaves a lasting impression. From this, I'm developing a flexible model called the "3-E Framework" (Engage, Empathize, and Evolve), helping marketers craft campaigns that are both culturally relevant and globally effective. As the study progresses, it will offer practical insights to guide brands toward more thoughtful, impactful, and inclusive advertising strategies.

Presenting Author(s): Pratham Dhandhania **Juniata College**

P2-18: Synthesis and characterization of palladium(II) complexes bearing Schiff-base ligands containing a pendant sulfur group.

The synthesis and coordination chemistry of a sulfur-containing Schiff base ligand with palladium(II) was investigated. The Schiff base ligand, which contained a thioimidazole group as the sulfur source, was synthesized in three steps in an overall yield of 84%. Coordination to Pd(II) was achieved by adding one equivalent of the ligand to a solvated Pd(II) starting material in methanol resulting in a red powder isolated in an 85% yield. Single-crystal X-ray diffraction confirmed the coordination of Pd(II) to the ligand through the imine nitrogen and the sulfur of the thioimidazole group. Surprisingly, the phenolic oxygen was not initially involved in binding, as is the case for many metal complexes of this type. Subsequent deprotonation of the Pd(II) complex with triethylamine resulted in the coordination of the phenolic oxygen through the formation of a [Pd(II)L]2 dimer. Additional characterization of these products was achieved through ATR-IR and 1H NMR. These experiments highlight the preference of Pd(II) to coordinate to the softer sulfur atom in Schiff-base ligands that possess NOS donor sets.

Presenting Author(s): Joshua Dow **Susquehanna University**
Additional Author(s): Dr. William G. Dougherty Jr.

P2-19: Preparation of novel peptide nucleic acid nucleobases aimed at improving PNA-RNA2 triplex stability for RNA containing pyrimidine interruptions

Protecting groups are valuable tools for the synthesis of complex molecules, by shielding reactive parts of a molecule while also being able to be removed easily later in a synthesis. In a related project, we had a need for synthesizing 1,2,3-triazoles with an acid cleavable protecting group. To prepare the protected triazole, a diarylmethyl chloride is used along with sodium azide to form the resulting organic azide. In the same pot, an azide-alkyne cycloaddition reaction catalyzed by copper(I) nanoparticles takes place to form a triazole with the key protecting group attached. To optimize the formation of the protected triazole, the experimental conditions were explored and modified with the aim of maximizing the purity and yield of the desired product. Experimental design was revised through altering the copper catalyst used, screening potential cosolvents, and exploring different protecting groups. Here, we report efforts toward the use of the diphenyl methyl protecting group and related diarylmethyl moieties. The results will be compared via the percent yield of pure product, so the most efficient experimental design can be chosen.

Presenting Author(s): Arianna Lepratto, Jacqueline Hammond **Elizabethtown College**

P2-20: Synthesis of Modified RNA Bases to be Used in Aptamer Drug Delivery Agents

A drug delivery agent selectively binds to a biological target to allow a drug to enter and perform its function. Antibodies are commonly used for this purpose, but aptamers are an alternative that are non-immunogenic and easier to prepare. Aptamers are short single stranded DNA or RNA molecules under 70 nucleotides long that reproducibly fold into specific shapes and specifically bind to target proteins. One important application would be aptamers that selectively deliver a highly toxic drug to cancer cells without harming non-cancerous cells. A synthesis scheme was designed to prepare a modified uridine to be incorporated into an RNA aptamer. The objective is to add hydrophobic amino acid-like side chains—phenylalanine, naphthalene, and tryptophan—to the base to increase the structural diversity and allow for better target binding. The starting material for this synthesis has a methoxy group on the 2' carbon, which stabilizes the RNA and protects it from nucleases. The amino acid like side chain is added through a Pd-catalyzed coupling reaction, followed by addition of the triphosphate to complete the synthesis.

Presenting Author(s): Aurora Pillars-Capoccia, Ashley Lozano **Goucher College**
Additional Author(s): Imogen Jeffries, Dr. George Greco

P2-21: Material Shielding Efficiency using Desktop Detectors

When high energy cosmic particles from space interact with our atmosphere they produce secondary particles, such as muons. Particle detector experiments near the Earth's surface detect these cosmically induced particles as background noise and must implement passive shielding to improve their experimental signal to background ratio. We used plastic scintillator-based desktop detectors (Cosmic Watch and Pico Muons from the UKRAA) to study the ability of four materials (lead, aluminum, polyethylene, and water) of various thicknesses to shield against ambient charged particles at surface level. These results are in general agreement with data from the Particle Data Group (PDG) and the

International Atomic Energy Agency (IAEA), and are used to suggest optimal combinations of materials for cost- and space-effective passive shielding at surface level.

Presenting Author(s): Eric Ranzan **Susquehanna University**
Additional Author(s):Dr. Adam Hansell

P2-22: Effect of Different UV Light Sources on Plastic Oxidation

In nature, plastics can take anywhere from 2.3-9,000 years to degrade. Although some plastics are able to degrade faster than others in the environment, the rate of plastic entering the environment is not sustainable. Many labs are using purchased plastic in their work to trace microplastics through the environment or to study the mechanisms of degradation. Plastics used by these labs are pristine and not accurate to real life where the plastic would have undergone at least surface degradation. This study looked into the effects of different sources of UV light on various kinds of plastics to see what UV source works the best. Being able to artificially age the plastic in the lab can help us design future experiments to be more "environmentally relevant" since essentially no plastics exist in the real world as perfect as we are purchasing them. We used Attenuated Total Reflectance Fourier Transform Infrared (ATR-FTIR) spectroscopy to measure degradation over time. Using carbonyl, hydroxyl, and carbon oxygen indexing, we were able to quantify actual changes in oxidation. Oxidation was observed in almost all forms of plastic. Polystyrene had the most obvious and consistent oxidation across samples. The UV microwave produced the most obvious oxidation across plastic types in the shortest amount of time.

Presenting Author(s): Eden Rovner **Goucher College**
Additional Author(s): Dr. Rebekah Gray

P2-23: Contemporary Formulation and Recreation of Song Dynasty Oil-Spotted Ceramics

The goal of this research is to formulate and test clay bodies, glazes, and techniques of glazing and firing to replicate the ceramic surface found on Southern Song Dynasty Jian wares. The challenges of achieving this effect are spread across the entire process of creating the pieces; the clay body, glaze formulas, glazing techniques, and firing atmosphere all play a crucial role in achieving the spotted surface. Utilizing historical records, geological survey data, and contemporary oil spot formulas, the goal is to yield an oil-spotted surface that resembles Song Dynasty tea bowls. For materials testing, the utilization of electric kilns is for the sake of consistency and ease. The focus of this research is the iron content in both the clay body and the glaze, and how they function separately and together to form an oil-spotted surface.

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P2-24: Carbon Trapping in the Soda Kiln

This research is focused on the investigation of carbon trapping. Carbon trapping occurs when soot becomes trapped on the surface of a ceramic piece while being fired. This results in black blossoms and spots. For this research I will be soda firing, a type of firing in ceramics where sodium carbonate is introduced into a hot kiln. Inside the kiln it vaporizes and interacts with the ceramics inside, possibly contributing to carbon trapping. To investigate, I will be testing various glaze formulations, sodium carbonate levels, and kiln cycles.

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